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End of Degree Project in Early Childhood Education  
Teaching specialisation

**“An e-learning authoring tool for a didactic  
unit for Early Childhood Education students  
(5 year olds): *Pets, farm and wild animals*”**

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## ***ABSTRACT***

This dissertation analyzes the general contribution of ICT and, in particular, of authoring tools to the pedagogical practice of teachers. The didactic unit “pets, farm and wild animals”, which is included in the second area of the curriculum of the 2nd Cycle of Early Childhood Education: “The physical, natural, social and cultural environment”, was developed with the authoring tool ARTICULATE Storyline 360. In the development of the modules, an attempt has been made to create animations in order to generate points of attention: put triggers (status or intersection of an object), buttons, add audios, videos and connections with web addresses, etc. Furthermore, different sorts of questions and activities have been created for students, to obtain an overview of student learning and performance during the course. Lastly, the teaching unit has been published in Articulate 360, HTML5, Flash, Word, CD, etc., to be used on computers, tablets, mobile phones, etc. This didactic unit is an attempt to use the authoring tool as a didactic mediation strategy elaborated to contribute to the strengthening of the pedagogical practice of the teachers and at the same time to the learning process of the students.

Key words: ICT, authoring tool, didactic mediation, pedagogical practice, natural science.



## ***RESUMEN***

Este proyecto fin de grado analiza la contribución general de las TIC y, en particular, de las herramientas de autor a la práctica pedagógica de los docentes. La unidad didáctica “Las mascotas, los animales de granja y los animales salvajes”, la cual está recogida en la segunda área del curriculum del 2º Ciclo de Educación Infantil: “El medio físico, natural, social y cultural”, se desarrolló con la herramienta de autor ARTICULATE Storyline 360. En el desarrollo de los módulos que comprenden la unidad, se ha intentado crear animaciones para generar puntos de atención: poner activadores (el estado de los dibujos o la intersección de un objeto), botones, añadir audios, videos, *links* con direcciones web, etc. Asimismo, se han creado diferentes tipos de preguntas y actividades, para obtener una visión general del aprendizaje y el rendimiento de los alumnos durante el curso. Finalmente, la unidad didáctica ha sido publicada en Articulate 360, HTML5, Flash, Word, CD, etc., para ser utilizada en ordenadores, tabletas, teléfonos móviles, etc. Esta unidad didáctica es un intento de utilizar la herramienta de autor como una estrategia de mediación didáctica elaborada para contribuir al fortalecimiento de la práctica pedagógica de los docentes y al mismo tiempo al aprendizaje de los discentes.

Palabras clave: TIC, herramienta de autor, mediación didáctica, práctica pedagógica, ciencias naturales.



## **RESUM**

Aquest projecte fi de grau analitza la contribució general de les TIC i, en particular, de les eines d'autor a la pràctica pedagògica dels docents. La unitat didàctica “Les mascotes, els animals de granja i els animals salvatges”, la qual està arreglada en la segona àrea del currículum del 2n Cicle d'Educació Infantil: “El medi físic, natural, social i cultural”, es va desenvolupar amb l'eina d'autor ARTICULATE Storyline 360. En el desenvolupament dels mòduls que comprenen la unitat, s'ha intentat crear animacions per a generar punts d'atenció: posar activadors (l'estat dels dibuixos o la intersecció d'un objecte), botons, afegir àudios, vídeos, *links* amb adreces web, etc. Així mateix, s'han creat diferents tipus de preguntes i activitats, per a obtenir una visió general de l'aprenentatge i el rendiment dels alumnes durant el curs. Finalment, la unitat didàctica ha sigut publicada en Articulate 360, HTML5, Flash, Word, CD, etc., per a ser utilitzada en ordinadors, tauletes, telèfons mòbils, etc. Aquesta unitat didàctica és un intent d'utilitzar l'eina d'autor com una estratègia de mediació didàctica elaborada per a contribuir a l'enfortiment de la pràctica pedagògica dels docents i al mateix temps a l'aprenentatge dels discent.

Paraules clau: TIC, eina d'autor, mediació didàctica, pràctica pedagògica, ciències naturals.



## ***OPERATIONAL DEFINITION OF TERMS<sup>1</sup>***

**Active learning:** ICT-enhanced learning mobilizes tools for examination, calculation and analysis of information in order to provide a platform for student inquiry, analysis and construction of new information. The learners therefore, learn as they do and, whenever appropriate work on real-life problems in-depth. Moreover, ICT makes the learning less abstract and more relevant to their life situations. In contrast to memorization-based or rote learning, that is the feature of traditional pedagogy; ICT-enhanced learning promotes increased learner engagement. ICT-enhanced learning can also be ‘just-in time’ learning that the learners choose what to learn when they need.

**Blended Learning:** refers to learning models that combines the face-to-face classroom practice with e-learning solutions. For example, a teacher may facilitate student learning in class contact and uses the “moodle” to facilitate out of class learning.

**Collaborative learning:** ICT-supported learning encourages interaction and cooperation among students, teachers, and experts regardless of where they are. Apart from modelling real world interactions, ICT-supported learning provides opportunity to work with students from different cultures, thereby helping to enhance learners teaming and communication skills as well as their global awareness. It models learning done throughout the learner’s lifetime by expanding the learning pace to include not just peers but also mentors and experts from different fields.

**Constructivism:** is a paradigm of learning that assumes learning as a process individual’s “construct” meaning or new knowledge based on their prior knowledge and experience. Educators also call it the emerging pedagogy in contrast to the long existing behaviourism view of learning.

**Creative learning:** ICT-supported learning promotes the manipulation of existing information and the creation of real-world products rather than the duplication of received information.

<sup>1</sup> Sharma, H.K. (2015). Role of ICT in Improving the Excellence of Education. International Journal on Computer Science and Engineering Vol. 7 No.8.





**E learning:** is a learning program that makes use of an information network- such as the internet, an intranet (LAN) or extranet (WAN) whether wholly or in part, for course delivery, interaction and/or facilitation.

**Evaluative learning:** ICT-enhanced learning is student-directed and diagnostic. Unlike static, text or print-based education, ICT-enhanced learning recognizes the presence of different learning pathways to explore and discover rather than merely listen and remember.

**Gamification:** it refers to the use of game-specific mechanism - principles, tools and techniques that are applied in a completely different context to the game. These concepts, however, must be applied differently, depending on the target group for which the content is designed. Depending on the level of knowledge acquired by students during the learning process, gamification can be used in order to improve understanding and assessment by developing skills. Game-based learning in education requires use of video games in the learning/training process. Illustrated virtual game world can have beneficial effects on learning and students can assimilate and develop practices that can be translated into social life. These results may be useful and accepted by the academic community to the detriment of classical methods offered by traditional school.

**Information Communication Technologies (ICT):** refers to the computer and internet connections used to handle and communicate information for learning purpose.

**Integrative learning:** ICT-enhanced learning promotes a thematic integrative approach to teaching and learning. This approach eliminates the artificial separation between the different disciplines and between theory and practice, which characterizes the traditional approach.

**Learner-centred learning environment:** is a learning environment that pays attention to knowledge, skills, attitudes, and beliefs that learners bring with them to the learning process where its impetus is derived from a paradigm of learning called constructivism. In the context of this article, it means students personal engagement to the learning task using the computer and or the internet connection.



**Ruling out static contents:** PowerPoint presentations, .pdf or .doc files suppose to introduce a degree of interactivity. Interactivity, adapted to the learning objectives leads to increased interest for study on the one hand; on the other hand, the level of complexity may be higher due to the way of explanation or presentation. It is also true and generally accepted that an individual learns from his own mistakes. Thus, interactivity can also be designed as a comparison, highlighting both erroneous results arising from the wrong choices and correct choices. Interactivity can be introduced by simulation based e-learning, game-based e-learning, gamification, concepts successfully used both in learning and training.

**Simulation based e-learning:** is a method that allows understanding and testing the functioning of a system in the real world in a safe environment, free of hazards. Based on input variables that characterize the conceptual model, a student analyses and notices behavioural changes of the analysed system. Simulation has a beneficial effect for learners by developing skills to make new hypotheses, interpreting data, and develops skills needed in the real world.

**U-Learning:** Ubiquitous learning, also known as u-learning is based on ubiquitous technology. The most significant role of ubiquitous computing learning in u-learning is to construct a ubiquitous learning environment, which enables anyone to learn at any place at any time. Some say that the evolution of ubiquitous learning has been accelerated by the improvement of wireless telecommunication capabilities, open network, continued increases in computing power, improved battery technology, and the emergence of flexible software architectures. This leads to u-learning that allow individual learning activities embedded in daily life. However, it is clear that there is clear definition of u-learning due to rapid changes of learning environments.

**Web-based learning:** is a subset of e learning and refers to learning using an internet browser such as the “moodle”, blackboard or internet explorer.



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## ***INTRODUCTION***

### ***1. Author's Description***

My name is Paula Cortijo Sanz, and in addition to being an under-graduate student of the Double Degree in Early Childhood and Primary Education- specialisation in English (PIMM) by the Catholic University of Valencia, I also have a Degree in Translation and Intercultural Communication by the European University of Valencia and a Postgraduate Degree in Methodology and Teaching of Spanish as a Foreign Language by the University of Valencia, ADEIT and the Cervantes Institute. In addition, my L1 is Spanish and I have the level C1 in English and Valencian and the level B2 in French. Likewise, I have an English language training certificate issued by the Catholic University of Valencia.

Since I was quite young, I have had the opportunity to spend time in England and France. Two in Gosport and one in Cambridge (England) and two in Vichy and one in Montpellier (France). My stays in England made me get to know the English people, language and culture, being pleasantly impressed by it. For this reason, I wanted to deepen my knowledge of the English language by presenting the End of Degree Project in this language. On the other hand, I consider that academically the effort made will contribute to my better training and knowledge of English as a foreign language, which will allow me to transmit this knowledge to my future students, since I consider it essential to reinforce the teaching of English in Early Childhood and Primary Education.

During these four years I had the opportunity to do internships in 4 different schools, in my 1st and 3rd year of PIMM I did them in an Early Childhood Education classroom. In my 1st year of PIMM, I was in Marni, a Multilingual State School, that belongs to the Foundation *Colegios Siglo XXI*, in a class of 5 year olds and in my 3rd year of PIMM in the Private Bilingual and Catholic School Cumbres School, which is part of the Regnum Christi School Network, in a class of 3 year olds. These two years I learnt and reflected a lot about the contents, areas, materials, methods, strategies and resources used by each educational centre, corresponding to that school stage.



Likewise, both schools are in favour of the use of ICT in the classroom during the teaching and learning process from an early age, the digital blackboard and the computer being the most used in the Early Childhood Education stage. Both in each classroom of the school and in the computer room.

They consider that the development of digital competence makes students learn more quickly and in a dynamic and playful way. Learning based on routines consisting of the projection of videos, audio-visual documents, digital materials, songs, stories, flashcards, interactive games, etc., available on the Internet or designed by the school itself.

On the other hand, it should be noted that both Marni Multilingual State School and Cumbres School, use educational innovation as a strategic line. Currently, the educational innovation projects of these schools are carried out both methodologically and technologically.

They have a Pedagogical Innovation Department, that is always active in the search for learning that is consistent with their educational model. They also develop their own materials adapted to the methodologies that they use in each educational stage, getting their Educational Project to have a solid base of their own content for deep learning.

Today's students want to learn differently. They are aware that their world is changing daily and exponentially. If involvement, motivation and passion improve the learning of students, schools must be able to offer them attractive and diverse tools and materials with which to connect to the real world. In addition, teachers have to teach them to access information, evaluate it, analyse it, synthesize it and apply it. The entire Technological and Methodological Project of Marni and Cumbres School is developed under these premises.

The observation and first-hand experimentation of educational innovation and the implementation of ICT since the Early Childhood Education stage in both centres, inspired me to carry out this End of Degree Dissertation.

The incorporation of ICT in the educational project of schools as a complement to textbooks and the master class, as well as the English language and the study of the physical and natural environment are aspects that I feel fascinated by.

Finally, I decided that I would teach 5-year-olds pets, farm and wild animals by creating software in English, through the interactive App Articulate Storyline 360.

In addition, it would be a theory and hypothesis project that will include the development of educational software using ICT tools. At the moment, it is not a work of experimentation, since priority is given in this case, to the design of an educational software and there's not enough time to be designed and tested by 5 year olds. Therefore, the experimentation would be left for a later or extended study in the Master's Degree or Doctoral Thesis. Also, since the design of the software will be in English, it was decided that the writing of the present work would also be in that language.

This project will highlight that there are different ways to foster learning of a traditional topic for Early Childhood Education. The use of ICT in the teaching and learning process of the physical and natural environment, specifically of pets, farm and wild animals, could favour that students in Early Childhood Education (5 year olds) learn dynamically, successfully, quickly and enrichingly.

## ***2. Objective***

### ***General***

Use an authoring tool to design a learning unit: "Pets, farm and wild animals" which covers content in the second area of the curriculum of the 2nd Cycle of Early Childhood Education: "The physical, natural, social and cultural environment", in order to assess its suitability for effective teaching and learning processes.

## *Specific*

- Identify authoring tools that can be applied by teachers during the teaching and learning process.
- Find out about the possibilities offered by the web in search of digital resources in the area of natural sciences
- Create animations, put triggers (status, intersection of an object), buttons, add audios, videos and connections with web addresses. etc., in order to generate points of attention.
- Create questions for students, using different types, to obtain an overview of student learning and performance during the course.
- Publish the didactic unit published in HTML5, Flash, word, CD, etc. to be used on computers, tablets, mobile phones, etc.

The work is organized as follows. The first section (Introduction) describes the types of ITC, their benefits and limitations, and the role of the teacher in the implementation of ICT. The learning theories, which is the CLIL methodology and the Legal framework for Early Childhood Education Curriculum in the Valencian Community, are briefly described below. In the second section (Methodology) it is described what the author programs are, in particular STORY line 360. In the third block (Results) the physical publication of the contents of the modules in WORD (APPENDIX I) and ZIP files deposited in the UCV virtual Campus are collected, which if the individual files are extracted, the file "Launch\_Story.exe" allows dynamic and interactive publication of the content of the modules of the teaching unit "*Pets, farm and wild animals*", this allows us to see what the interface is like that the students see. Finally, in the fourth block (Discussion), the results obtained are analyzed and the main conclusions of this work are exposed (Conclusion). At the end of the work the bibliography and resources used are attached.

### ***3. Information and Communication Technology***

For a few years now, new technologies have changed the lives of human beings in many areas Education being one of the main ones, since the way of imparting knowledge has changed due to technology, to which teachers and students must or “have had to” adapt. They must use it to learn, study, communicate and socialize.

Nowadays, it can be said that most students know how to use a large number of tools to communicate, so it is relatively easy to employ them to connect with their teachers; among them are chats, videoconferences, electronic whiteboards, emails and forums.

As it has already been observed for a few years, the integration of ICT (information and communication technologies) in education provides the opportunity for more people to have access to knowledge, and teaching innovation can also be applied to learning, and ultimately to education. All this has meant that teaching and learning have been transforming in the classroom compared to traditional education (Amin, 2013; Rainer, Fernández-Rodríguez & Lombardero, 2013; Soni, 2016; Virca, Oancea & Gligorea, 2017; Adam, 2017; Saxena, 2017; Adebayo, 2019). By applying new technologies, one can move from the classic teaching model based on the reproduction of knowledge to a new model in which the student becomes more independent, since they promote initiative and creativity and also favor critical thinking.

Nevertheless, pedagogy must prevail over technology and for teaching to be effective, new technologies must be well managed with the main purpose of improving the learning of the different subjects as well as motivating students and promoting collaboration and research in a context where the student is at the center of the teaching process.

When activities are planned where students must collect and select data, analyze and organize it, expand and change knowledge and finally present them using ICT, they become active participants, for this to happen, the teacher must create an appropriate learning environment. On the other hand, the role of ICT in educational changes must be well understood, the center of everything must be the application of pedagogy with





pedagogical technology when designing a teaching innovation project, knowing that the use of ICT changes the distribution and ownership of information resources.

Many research projects have shown that the use of ICT improves the quality of teaching. For example, using the computer has improved the quality of learning (Jhurree, 2005). In the first years of using ICT, only programming was important, but in the 1970s, there was a huge development of microprocessors so that affordable computers could be made available in schools. Although it was later that the teaching of traditional subjects was integrated, since society must first be prepared for the acceptance and learning of ICT (Pelgrum & Law, 2003).

In the 1990s, there was a computer revolution and access to information for a large part of society, especially due to the popularity and ease of access to the Internet so that we can have email and enter the World Wide Web (WWW). At the same time, the CD-ROM was developed and displaced the floppy discs used until then to handle packaged software. These changes induced that those responsible for education had to focus on learning and using new technologies to help students to learn. The use of information and communication technologies in the educational process involves two circumstances. On the one hand, ICT *for* education, which refers to its application for teaching and, on the other hand, ICT *in* education, which imply general knowledge of new technologies to be applied in teaching.

The development of ICT makes the relationship between teachers and students closer and there is greater communication, which helps to improve the quality of teaching. As mentioned before, teachers must make an effort to learn and apply ICT and participate in projects and develop intervention strategies to achieve the objectives of change, using these technologies as a tool. As Zhao & Cziko (2001, p. 16) point out, “teachers need three conditions to introduce ICT in their classrooms:

- Teachers must believe in the effectiveness of technology
- Teachers must believe that the use of technology will not cause discomfort
- Teachers must believe that they have control over technology.”

Furthermore, the use of ICT as sources of information and knowledge tools promote independent learning in students. Contemporary teaching considers that the acquisition of knowledge is an active and dynamic process, it is not a simple process of transmission of knowledge (Duffy & Cunningham, 1996) in which memory participates in an important way (Lebow, 1993; Jonassen & Reeves, 1996). The center of everything is the student, who is provided with resources and tools so that they can build up their knowledge of any area they study.

Teachers should think about promoting tasks using ICT that are interesting and innovative for students, and they must learn and research independently or in groups to acquire the skills that will be necessary in their future.



*Figure 1.* The use of ICT in the educational environment. Retrieved from Google Images.

The use of ICT provides many advantages in many fields including teaching due to the easy and immediate access to learning through which books, previous tasks, examples, tutorials, etc., can be consulted and on the other hand, there is also easy access to teachers, experts and researchers not only from your immediate environment but from all over the

world. Furthermore, knowledge can be taken to more disadvantaged groups (Young, 2002).

The resources that allow the creation of ICT have facilitated a greater relationship between teachers and students if we talk about the field of education or between professionals from other fields, since everyone can quickly and immediately access research articles or material used for a certain course from anywhere and at any time, for example with digital libraries (Cholin, 2005).

In some surveys of parents of students on the use of ICT, most respond that children are more motivated to learn than when using only the 45-minute lecture in which the teacher speaks and the students listen.

The educational revolution of the 21st century is based on the change of content and pedagogy through the use of ICT. Kulik (1994) carried out an analysis and the results obtained showed that the students who used ICT, obtained higher marks than those who did not have access to computers. He also observed that those who used ICT learned more in less time and, naturally, they liked their classes more. Additionally, Attwell & Battle (1999) studied the relationship between having a computer at home and school performance, the results obtained showed that students who had a computer at home obtained better marks in reading and mathematics.

Consequently, it can be said that in the 21st century, very important changes have been made in education, the student is more active and the teacher is a facilitator of knowledge. When designing activities that use ICT, the teacher must take into account that learning and pedagogy are at the center of the teaching-learning process. Therefore, it is essential that teachers participate in collaborative projects and in the development of strategies that include ICT as an educational tool.



### **3.1. Different types of ICT integration**

ICT applied to education are those technologies that include computers, the Internet, multimedia simulations, virtual laboratories, transmission and telephony technologies, that can facilitate not only the delivery of instruction, but also the learning processes. These general objectives should guide the choice of technologies to be used and their modalities of use. The potential of each technology varies according to how it is used.

The different types of integration most used are described below.

#### **3.1.1. Multimedia planning**

The advantage of multimedia teaching is that it uses the information processing skills that we already possess as humans. The eyes, hearing and brain are able to act together to transform sensory data that in isolation do not represent anything, into information. The most important thing when designing multimedia teaching is knowing which are the best means at each moment and its subsequent application that is best adapted to achieve the teaching objectives (Phillips, 1997). The design should be student centered as opposed to the traditional teacher centered approach. Currently, teachers know that multimedia courses offer a pedagogical improvement compared to traditional teaching methods since they provide students with the following advantages: Exercise more effective and efficient control over their own learning, evaluation and comments in real time, secure more information about your own learning, obtain appropriate learning assistance for the situation and get more individualized learning assistance.

#### **3.1.2 E-learning**

Online learning known as e-learning is one of the most innovative processes, whereby teachers and students connect in an electronic / computer media network (Majumdar & Park, 2002). Teachers must have training in e-learning and know how to use it so that the use of ICT is effective. The term e-learning, must take into account the change in pedagogy that must be adapted to this kind of teaching and, on the other hand, while e-



learning won't replace traditional classrooms, it will change the way we know them today. Students can arrive, learn, engage all at their own pace in a collaborative environment. For teaching, e-learning is learning with and through all electronic means (that is, ICT) what must be applied in the curricula to support the teaching of students. ICT are the means, and e-learning and effective integration of pedagogy are the goal. The benefits of e-learning could include: its use anytime, anywhere, asynchronous interaction and group collaboration.

### 3.1.3 Blogs

A blog is a web page that includes short posts that are updated and organized chronologically just like a magazine “news” page. The topics and intentions of the blogs vary, they can include links from other websites or even from other blogs, news, photos, poetry, mini-essays, etc. Blogs are increasingly used by teachers. Some experts predicted that they would become teaching tools whose use would be very successful (Glenn, 2004), and they were right, as they are widely used in educational contexts nowadays.

Teachers can use blogs pedagogically to give advice, introduce knowledge, put announcements, annotate links of interest in order to manage knowledge, and students can participate in them writing essays, submitting assignments and writing down resources related to the course.

### 3.1.4. Interactivity

One of the key roles claimed for ICT in promoting learning is interactivity, the ability to respond contingently to the learner's actions. Currently, interactivity has an important role in teaching, but this concept is not easy to define. The forms of interactivity can be ordered using a scale of student influence from lowest to highest, you can start with a 'conference' in which there is no interaction between the teacher and the students and continue with related questions, probing, recruitment until the comment in class. On the higher scale, collective, reciprocal, sustained, cumulative teaching would be represented. The characteristic interactivity of ICT would help interactive teaching, for example the

interactive whiteboard should be very useful for this type of teaching. PowerPoint presentations, .pdf or .doc files introduce interactivity that adapts to the teaching objectives that depending on the level may be more or less complex (Bucoivetchi, Stanciu & Simone, 2015), for example, creating links to navigate the document. On the other hand, interactivity can be considered as a comparison that provides both the erroneous results that appear from the incorrect and the correct answers. Interactivity can be done in simulation-based e-learning, game-based e-learning, gamification and e-learning authoring tool (see the following sections)

### 3.1.5. Simulation based e-learning

This type of learning allows us to understand and test how a system works in the real world but within a safe environment, without risks. The student can study and notice the changes in behavior of the studied system (De Jong, 1998). Simulation helps students develop hypothesis-thinking skills, interpret data, and implement skills necessary to apply in the real world (Chang, Chen, Lin & Sung, 2008).

Representative examples of simulation in e-learning can be clinical cases that start from when the patient arrives at the hospital until the moment a doctor sees him and a diagnosis can be made with tests, etc. or in a natural science lesson about solar energy.

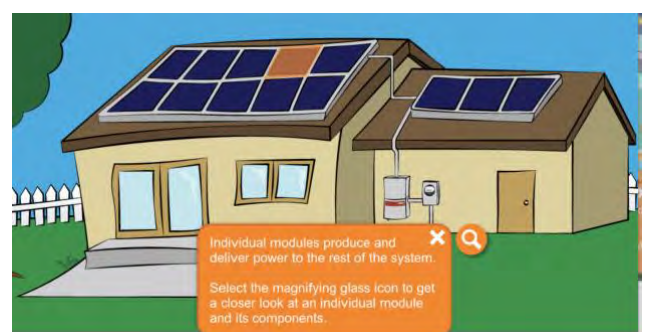


Figure 2. Game-based learning in education. Retrieved from Google Images.

Gamification refers to the use of game-specific devices: principles, tools and techniques, but which are applied in a different environment from the game (Perrota, Featherstone,



Aston & Houghton, 2013). Depending on the level of knowledge that students have, gamification can be used to improve understanding and evaluation of the topics covered.

Gamification is about adding games to a non-gaming situation. In the classroom, gamification generates a more attractive adventure profile based on the existing course. In addition, the evaluation system may be different from the usual one, for example, you can advance in the level of the game as the games are performed well. Set goals by assigning badges, experience points, levels, and leaderboards, which stimulates student participation by allowing them to progress at their own pace through a series of educational programs. An example of gamification could be “Duolingo” a language learning platform used by more than 70 million people worldwide, where gamification has been built into every lesson to make learning another language fun and addictive.

Unlike gamification, game-based teaching involves using games to improve learning. Games have long been used in the classroom. For example, “Kahoot” is a quiz game where teachers can write multiple choice questions and Kahoot will track the points of everyone in the class and export the data to a spreadsheet for analysis.





*Figure 3. Different types of ICT integration.*

### **3.2. Benefits of ICT in education**

As previously exposed, ICT have brought about a change in the focus of teaching and student learning. In recent years, schools in the West have invested in ICT infrastructures and students have access to computers. It has been seen that those students who use ICT learn much better than those who do not use it. For example, Kulik (1994) carried out different studies in the United States that led him to some interesting conclusions: students who used computer tutorials in mathematics, natural sciences, and social sciences scored significantly higher on exams in these subjects, and students using science simulation software also scored higher. Elementary students who used tutorial software in reading scored significantly higher on reading tests. Finally, students who used word processors to write scored higher in writing ability.





The traditional learning approach believes that learning is a transmission of knowledge to students, the sole responsibility of the teacher, while the constructivism approach believes in student-centered learning. The use of ICT in education is believed to confer more constructivist learning and greater student activity and responsibility. Are tools for doing work, gathering data and documentation, doing research, but they are also a means of teaching and learning. They are a means by which teachers can teach and students learn.

With the traditional type of classroom teaching, when each student has a different rhythm, teachers have difficulty adjusting to all of them; but with new technologies, the teacher can teach interactive multimedia-based classes in which each student can work at their own pace according to their needs and knowledge. In addition, the time could be adapted, various attempts could be made to solve the problems and what could not be done in class could be completed at home, all this can be facilitated using ICT as pedagogical tools. Such a system allows students to be part of a continuous learning cycle, regardless of whether they are in a classroom or not, or if they are all together synchronously or asynchronously.

Consequently, ICTs are tools that allow knowledge to be taken much further than with the usual class, since they make it possible to search for information in a much broader way, to carry out work or practices with that information and also to share knowledge. On the other hand, you can practice in such a way that if you make a mistake you have the possibility of doing it again and even doing it at different rates, which leads to a better assimilation of learning (Kennewell, Parkinson & Tanner, 2000).

Today, there are multiple ways to apply new technologies, such as content development that can be done online, searching for information and knowledge on the Internet, and email communication. To do this, teachers must know the key tools and how to apply knowledge through teaching innovation.

To conclude, the use of ICT implements student performance in all subjects and moves towards constructivism learning.



### 3.3. Limitations of integration to education systems

The limit that can be found in the application of ICT is the behavior of the students. It is assumed that students will make good use of the computer and the Internet, however it is known that students sometimes misuse technologies and use them for leisure activities. The biggest drawbacks that have been observed (Yousef & Dahmani, 2008) have been the use of online games, Facebook, chats, instead of using time for study, since today in most houses there is Internet access (Kulik, 1994). If ICT are not used correctly there may be more disadvantages than advantages. Several disadvantages have been identified in the use of ICT in education related to student behavior (Yousef & Dahmani, 2008):

- Students, due to the ease of obtaining information, tend to use their imagination less, to analyze things less and not to have critical thinking.
- Students can be distracted since they have the possibility to connect to games or other places that distract them from their study and have a superficial vision of the subject.
- There may be a danger that students only know how to use the internet to study neglecting other resources that may also be important such as handwriting and oral skills.
- The use of ICT can be difficult for weaker students, who may have trouble working independently and may need more teacher support.

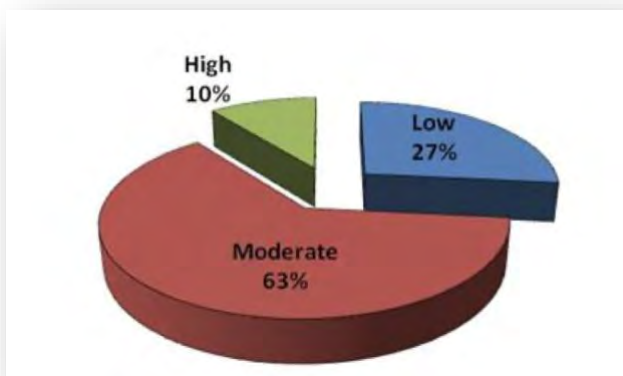
There are other limitations that do not depend on student behavior, such as those related to the value of technology and the maintenance of facilities, virus attacks, interruptions to Internet connections and disconnection of electrical energy. But undoubtedly, the greatest weakness of ICT is that the student uses them for purposes other than studying or learning school subjects.

### 3.4. Teachers as key in the process of ICT implementation

The participation of teachers is essential in the use of ICT in teaching. For everything to work correctly, teachers must have a minimum preparation since they must advise their students. A study has been carried out where Teaching Degree students must answer a questionnaire to see their knowledge of ICT and the results are grouped into three ranges:

- Low: They are only capable of performing basic actions in computing.
- Moderate: They have greater knowledge and can use computer applications for teaching.
- High: They master computing and can use a wide variety of applications for teaching.

The results obtained show that, out of a total of 124 Teaching Degree students who answered these questions, 27% (n = 13) have a low degree of readiness to use ICT in teaching, 63% (n = 78) have a moderate degree of readiness to use ICT in teaching and 10% (n = 13) show a high level of readiness to use ICT in teaching (Figure 2). After observing these results, it can be concluded that the same participants note that they are not sufficiently prepared for the use of ICT. Only 10% believe that they are highly qualified in the use of ICT (Apeanti, 2014).



*Figure 4.* Perception of Teaching Degree students in the level of preparation for teaching with ICT. Author: Apeanti, W. (2014). Global Educational Research Journal, 2 (10), pp. 174-184.



The development of ICT in the classroom will depend on the preparation that the teacher has on this subject and the attitude that he/she shows for its application (Angers & Machtmes, 2005), of course, a positive attitude will make the use of technology in the classroom is greater and therefore the students will also perceive it as positive, so that the pedagogical content can be better applied. The process to introduce ICT in education is complex and sometimes the financial costs is a lot, this may be due to multiple causes that should be studied (Inan & Lowther, 2010).

There are different variables that can determine the implementation of ICT:

- The teachers' experience in education: it has been seen that the age of teachers is closely related to the application of ICT, so that with older age and years of experience, teachers are more reluctant to implement ICT, probably due to unfamiliarity (Hermans, Tondeur, Mvan Braak & Valcke 2008; Inan & Lowther, 2010). If teachers are experienced and use ICT at home and at school, they will be better able to apply it in the classroom (Hermans, Tondeur, van Braak & M. Valcke, 2008). Different studies have been carried out on this in Secondary Education (Van Braak, Tondeur & Valcke, 2004) and in Primary Education (Hermans, Tondeur, Mvan Braak & Valcke, 2008).
- The teacher's personal characteristics: innovativeness, and teacher self-efficacy: It depends on the teachers who want to change and innovate the teaching of their classes in the classroom, for this the use of computers is needed (Tondeur & Valcke van Braak, 2007; Tschannen-Moran & Woolfolk, 2001).
- The teachers' ICT competences: lack of knowledge and lack of skills is a handicap for the development of ICT by teachers (Hew & Brush, 2007). Teachers must know technology to be able to develop pedagogical knowledge and then take it to the classroom and apply it. It is important that the teacher, when going to apply ICT, has great confidence that he/she dominates this field (Sang, Valcke, van Braak & Tondeur, 2010).
- The teacher'ICT professional development: in order to apply ICT: teachers have to learn and train, and schools have to invest in infrastructures that allow this training and therefore provide security that will translate into positive attitudes to

develop ICT (Vanderlinde & van Braak, 2010). The greater the access to training, the more new technologies have been seen to be applied (Valcke, Rots, Verbeke & van Braak, 2007).

- The teachers attitudes towards ICT in the classroom: they are based on teachers appreciation of the importance of technology in the benefit obtained by students and also in the change of teaching practices and activities (Inan & Lowther, 2010; Mueller et al., 2008; Sang, Valcke, van Braak & Tondeur, 2010).



Figure 5. Teachers as key in the process of ICT implementation.

#### **4. Learning theories and their link to ICT**

The basic theories of modern learning are cognitivism, behaviourism, constructivism, connectivism, planned behaviour, technology acceptance model, and problem-based learning (Jean, 1953; Papert, 1982; Seely-Brown, Collins, & Duguid, 1989; Duke, Harper, & Johnston, 2013). In this section of the dissertation, we will focus on their main features in relation to the use of ICT.



#### **4.1. Cognitivism learning theory**

According to Good & Brophy (1990), cognitive learning theory is the achievement or reorganization of cognitive structures through which students process and store information. This theory is based on the fact that knowledge is built in the student's mind, which then obtains the information through memory. The use of ICT would activate the student's memory that was already coded for later recovery. Cognitivism gives importance to the environmental conditions that facilitate learning. Instructional explanations, demonstrations, illustrative examples, and matching non-examples are considered tools that enhance student learning. Another aspect to highlight is that this theory gives an important role to practice with corrective feedback.

As already mentioned, memory plays an important role in this theory, good learning results are obtained when the information is stored in memory in an organized and meaningful way. Teachers have a duty to help students organize that information in a correct way. To do this, they must use techniques such as analogies, hierarchical relationships, and matrices to help students relate new information to prior knowledge. When knowledge is acquired, it must be verified that it has been stored in memory, that is, that the information has been transferred. When a student understands how to apply knowledge in different contexts, the transfer occurs (Ertmer & Newby, 2013).

#### **4.2. Behaviourism learning theory**

Behaviourism is based on the behaviour of students when they receive a stimulus, which causes their behaviour to change, that is, there is an answer. In this case thought and the brain are seen as empty space. The use of ICT would be applied as the presentation of a problem (stimulus) followed by a solution that would be the answer provided by the student.

In this theory, no importance is given to how knowledge is stored and obtained, but habits are more important. When a response is not used routinely, it is forgotten. The use of periodic practices or reviews serves to maintain the student's willingness to respond.



The behaviour theory says that the teacher's work determines the signals that provoke the desired responses and also organizes practices in which the indications are combined with the stimuli. Finally, it determines the environmental conditions so that students can respond correctly to the target stimuli and receive reinforcement for those responses. In this case the transfer is carried out by applying the knowledge learned in new situations.

Behaviourists establish strategies that are valid to build and strengthen stimulus-response associations, such as the use of instructional, practice, and reinforcement cues. It has been observed that this methodology is adequate and effective to achieve learning, such as remembering facts, defining concepts, using learned explanations and being able to automatically perform a certain procedure. On the other hand, behavioural principles by themselves do not explain the acquisition of higher level skills such as language development, problem solving, critical thinking (Ertmer & Newby, 2013).

#### **4.3. Constructivism learning theory**

This theory is based on the fact that students understand things and learn (Savery & Duffy, 1995; Jonassen, Peck & Wilson, 1996; Bhattacharjee, 2015), this process is always active. First, students must understand the topics presented (Savery & Duffy, 1995). Secondly, the tools used in teaching to understand the content are important, for this the student must have the desire to learn in the classroom and apply the knowledge he has from previous experiences, all together builds the understanding of what it must be learned (Ackermann, 2001). Finally, to know if knowledge has been built, an assessment of what the student has understood must be made. According to Piaget (2013), students include knowledge in their minds from previous experiences. Students gain experiences by talking to other peers, advanced students, and teachers, thus being able to build their own understanding of the needs assessment process. This theory is widely used in preparing lawyers, doctors, architects, and businessmen through the use of apprenticeships and on-the-job training.

#### 4.4. Connectivism learning theory

Connectivism, is the thesis that knowledge is distributed across a network of connections, into its nodes, and therefore, learning consists of the ability to construct and traverse those nodes connected into networks. This theory is relatively new (1994), it is believed that with the development of new technologies a new way of learning is needed, with the use of ICT being the centre of everything, which has many criticisms (García, Brown & Elbeltagi, 2013). Learning is based on an activity of interaction between several people in a rapidly changing digital social world, not as an individual theory.

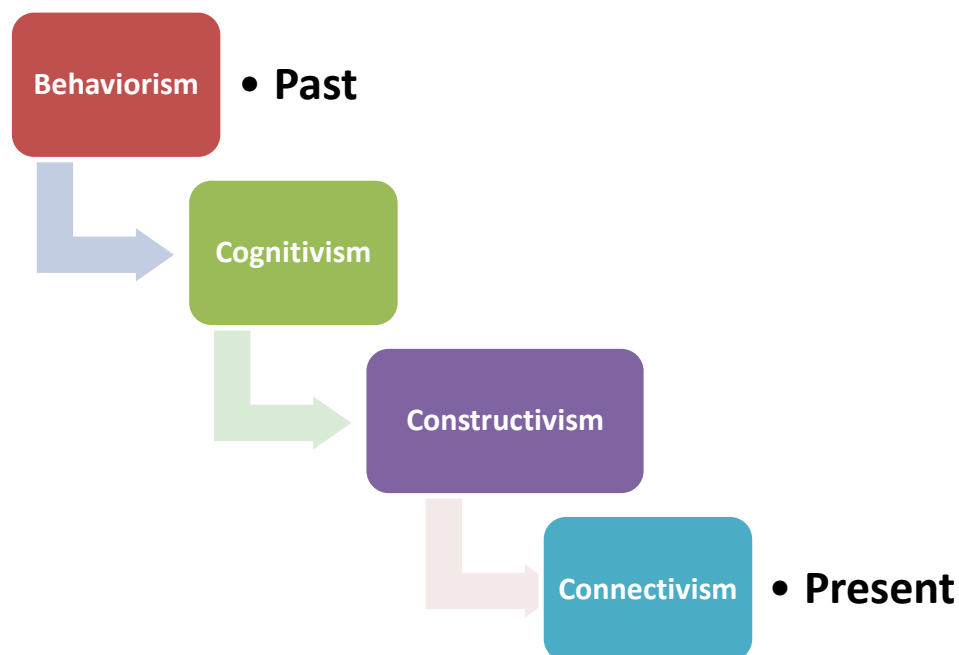


Figure 6. Learning theories.

#### 5. Future developments

The 2030 Agenda for Sustainable Development includes ICT as fundamental tools for education worldwide as they provide equal access to information to all social classes, countries and do not discriminate regarding gender (UNESCO, 2018).





As it has been indicated throughout this dissertation, one of the main key to achieve these objectives is that teachers are provided continuous training so they are well prepared to use ICT, and to be able to put ICT the service of students, which in turn will improve the quality of education,. In addition, they must know how to lead students so that they can solve problems, they know how to work both in groups and individually and they are independent so that in their future work they can apply both the knowledge and the tools acquired throughout their academic training.

### ***6. ICT use in Early Childhood Education***

There is extensive literature on the application of ICT in Primary and Secondary Education, but when it comes to early childhood education, it is more difficult to find articles related to it. On the one hand, ICT is fully introduced in higher education but in Early Childhood Education there are pros and cons about its use. There are authors who are completely in favour and others against, it has been published that when they are used a lot in young children it can be detrimental to spoken and written language (Cordes & Miller, 2000; Kerckaert, Vanderlinde & van Braak, 2015). On the other hand, other authors advocate that the use of ICT favours learning in Early Childhood Education (Hatzigianni & Margetts, 2012). Young children are curious about the environment that surrounds them and this favours the use of ICT if games or experiences are made that are suitable for them and also stimulates social relationships, creativity and playing time. The reality is that children today are born with ICT fully immersed in society. Mobile phones, computers and other electronic gadgets are used by them as soon as they are prepared to do so. Also, it should be noted that usually their first contact with ICT is through games.

Therefore, due to this close relationship with ICT that children have since birth, it seems logical to think that when they arrive at school, this situation is used to implement knowledge and learning. Some authors agree that children's cognitive development is greater when ICT are applied (Mc Manis & Gunnewig, 2012) in their study plans, for example, learning of literature and languages can be done by observing drawings, sounds and recognizing letters when they appear on the computer.

Furthermore, ICT can also be effective to expand the reasoning capacity and solve easy problems, children in principle cannot be in a fixed place for a long period of time, children are active and move a lot by what must be offered are frequent changes in learning. In addition, they can develop fine motor skills through button manipulation and they can also improve gross motor skills by playing with moving dummies.

Likewise, as it has been emphasized throughout this project, children's teachers and educators must have a good background in ICT and then know how to apply and teach them properly, so that children can develop all the knowledge they offer and have adequate cognitive, social and emotional growth. It is essential that teachers who teach Early Childhood Education Degree students have training and teaching capacity so that they can apply them with good academic quality and learn to use technological tools in the classroom with young children (Gill & Dalgarno, 2015).

Traditionally, it is thought that in Early Childhood Education schools, the learning process is fundamentally based on playing and the curricula have fewer rules than in Primary Education (Plowman & Stephen, 2003). In addition, the integration of ICT in Early Childhood Education would be different from integration in primary education, in the former the centre of everything is the child and the latter is a more formal and guided education (Campbell & Scotellaro, 2009). For example, in early childhood education, the use of the computer is focused when it is in free time when the child can choose not only to use the computer but to play with other things (Plowman and Stephen, 2005), which seems to put the pedagogy taught at a disadvantage by ICT.

What seems clear is that when ICT is used, such as the digital whiteboard, the teacher has to participate actively leading the children, he cannot leave them free, in this case the technology is used to teach, not to play (Morgan, 2010).

In summary, what can ICT contribute to early childhood education? In the first place, they can be an additional tool that is used as a game that develops their personality (Bolstad, 2004). For example, they can learn vocabulary playing with ICT or they can help the development of language and the learning of other languages and the formation



of mathematical thinking. The use of ICT can also be essential and even necessary for those children with special situations or needs who need support or even in situations where there are children from different countries who speak different languages in the classroom. (Bolstad, 2004; Kalas, 2010). In addition, ICT by their own presentation with bright colours, drawings, immediate feedback, speed, etc. usually attract children. For all the described above, it could be affirmed that the use of ICT is also a great advantage for the development of the child in his early childhood stage (Wood, Specht, Willoughby & Mueller, 2008).

### ***7. Legal framework for Early Childhood Education Curriculum in the Valencian Community***

This Decree (Decret 38/2008, 28 de marzo) includes the objectives, content, methodology and evaluation criteria that must be covered in the second cycle of Early Childhood Education<sup>2</sup>.

The first years of human life, basic learning is carried out and a relationship with the environment different from the family nucleus begins, which will help the development of the individual, oral language will be present in all educational situations in schools . The use and understanding of the written language appears when they have reading and writing activities. In the Valencian Community, the development process of the written language in the two co-official languages must be guaranteed. In the 21st century, the use of new technologies must be provided, along with the learning of other foreigners.

The second cycle is intermediate between the first cycle of Early Childhood Education and the first cycle of Primary Education, the transition between the two stages must produce a sense of continuity. At this stage, boys and girls are 3 to 5 years old and education is voluntary and free.

<sup>2</sup> [http://www.dogv.gva.es/datos/2008/04/03/pdf/2008\\_3838.pdf](http://www.dogv.gva.es/datos/2008/04/03/pdf/2008_3838.pdf)



Throughout early childhood education, habits of control of movement and the body are developed, communication through different languages and learning to relate socially. Furthermore, it is facilitated for girls and boys to develop a positive and balanced self-image, acquire personal autonomy and develop their affective skills.

Each group class has a teacher specialized in Early Childhood Education who acts as a tutor and collaborates with other teachers who participate in individualized attention. They must also observe and help students with special needs. The teachers carry out the tutorial action and periodically inform the families about the educational evolution of the students.

The objectives of this cycle are the following:

- a) Know your own body and that of others, and its possibilities of action and learn to respect differences.
- b) Observe and explore their family, natural and social environment.
- c) Progressively acquire autonomy in their usual activities.
- d) Develop your emotional skills.
- e) Relate with others and acquire elementary guidelines for coexistence and social relationship, as well as exercising in the peaceful resolution of conflicts.
- f) Develop communication skills in different languages and forms of expression.
- g) Start with logical-mathematical skills, in literacy and movement, gesture and rhythm.
- h) Know that in the Valencian Community there are two languages that interact (local language and Spanish), which must be known and respected equally, and progressively expand the use of the local language in all situations.
- i) Discover the existence of other languages within the framework of the European Union and start learning one of them.
- j) Know and appreciate the cultural manifestations of their environment, showing interest and respect towards them, as well as discovering and respecting other nearby cultures.
- k) Assess the various artistic manifestations.
- l) Discover information and communication technologies.



The educational centers adapt the curriculum established by this decree through the educational project of the center with its characteristics, its social environment, the educational needs of the students and in which the educational objectives, priorities and procedures for action are established. They establish didactic programs (work projects, didactic units, etc.), which include all the contents of the different areas and are developed through globalized units and respecting the rhythms of play, work and the rest of the students. The department of education establishes innovative projects, didactic materials and models of teaching programs that facilitate the work of teachers

The educational intervention must have as its principle the diversity of the students, adapting the educational practice to the personal characteristics, needs, interests and cognitive style of girls and boys, given the importance that the development process acquires in these ages. of Early Childhood Education must inform families about the educational evolution of their daughters and sons.

### **7.1. The curriculum of the 2nd cycle of Early Childhood Education**

References to teaching and learning about pets, farm and wild animals are included in the second curriculum area of the 2nd cycle of Early Childhood Education: “The physical, natural, social and cultural environment”. Moreover, the teaching of animals is related to the second block of contents: “Approach to nature”, from the second area of the curriculum of the 2nd cycle of Early Childhood Education.

The contents included in block 2 “Approach to nature” are: *a) Knowledge of the general characteristics of living beings and inert matter: similarities and differences; c) Observation and exploration of animals and plants in their environment; e) The development of curiosity, care and respect towards animals and plants as the first attitudes for the conservation of the natural environment; f) The identification of different types of landscape: rural landscape and urban landscape.*

(Diari Oficial de la Comunitat Valenciana, 2008, p. 55029).



The following table indicates a model of objectives, skills, content, means and criteria for evaluation of a didactic unit on “Pets, farm and wild animals.



## Teaching unit: “Pets, farm and wild animals”

<b>General objectives</b>	<ul style="list-style-type: none"><li>• Identify different animals in the natural environment, analyzing their characteristics</li><li>• Identify, classify and know some pets, farm animals and wild animals</li><li>• Know the parts of the body of animals</li><li>• Know the sounds of animals</li><li>• Caring for and respecting animals</li><li>• Valuing the importance of the animal world in people's lives</li><li>• Begin to use technological instruments, valuing their potential as communication and expression promoters and as a source of information and diversification of learning</li><li>• Expand vocabulary with words related to the contents of the didactic unit</li><li>• Enhance language skills</li><li>• Begin to know and use some basic words in a foreign language related to daily life routines and activities carried out in the classroom.</li></ul>
<b>Specific objectives</b>	<ul style="list-style-type: none"><li>• Recognize the elements of the whiteboard: white screen, computer, touch pointer, projector</li><li>• Recognize some basic elements of the computer: monitor, keyboard, mouse, speakers</li><li>• Identify and differentiate between different pets, farm animals and wild animals</li><li>• Properly turn the computer on and off</li><li>• Take the mouse and the touch pointer correctly</li><li>• Drag items across the screen with the touch pointer</li></ul>

	<ul style="list-style-type: none"> <li>• Drag items on the monitor with the mouse</li> </ul>
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Respect and care for animals</li> <li>• Trust their own possibilities</li> <li>• Acquire personal safety habits</li> <li>• Handle correctly mouse and touch pointer</li> <li>• Drag items across the screen with the touch pointer</li> <li>• Drag items on the screen with the mouse</li> </ul>
<b>Contents</b>	<ul style="list-style-type: none"> <li>• Domestic animals and their habitat</li> <li>• Wild animals and their habitat</li> <li>• Farm animals and their habitat</li> <li>• The attention and care that animals need</li> <li>• Games and interactive activities</li> <li>• Handle correctly some technological elements: computer</li> <li>• Spatial situations: inside-outside, near-far, open-closed</li> <li>• Quantifiers: one - many</li> <li>• Count from 1 to 10</li> <li>• Measurement of objects: short - long</li> <li>• Guided observation of the characteristics of some animals</li> <li>• Respect for the life of any animal</li> </ul>



	<ul style="list-style-type: none"> <li>• Positive attitude in the treatment of animals</li> <li>• Interest in learning new things</li> <li>• Didactic unit vocabulary</li> <li>• Words and expressions of a foreign language related to the unit</li> <li>• Buco facial motor skills</li> <li>• Riddles</li> <li>• Identification of animal sounds</li> <li>• Initiative and interest in participating in oral communication situations</li> <li>• Interest in improving their language productions</li> </ul>
Previous knowledge	<p>Before starting the didactic unit with the students, it is important to investigate about their previous knowledge about animals, as well as their interest in them. To do this, we will place the students in an assembly and we will ask them one by one questions such as: “What is an animal? Have you ever seen one? Do you have pets at home? Have you ever been to the zoo? And to a farm? What do they eat? Where do they live? Have you seen any animal films? Which ones? Do you like animals? Do you know the parts of the animals? What noises do they make?”. In this way, we inform ourselves about the knowledge that the class-group has about animals and at the same time we make students activate that knowledge and show interest in learning more about them. The intervention of the pupils in the assembly will be in an orderly way, respecting the speaking time of their classmates, where also active listening will be put into practice. If any student wants to intervene to comment or give his/her opinion on the intervention of a classmate, it will be the teacher who will randomly indicate which student intervenes.</p>

Resources	The main resources necessary to carry out this teaching unit are: digital whiteboard (white screen, computer, projector and touch pointer) and all the links through which we can access the different activities as well as extensive information on this tool.
Evaluation criteria	<ul style="list-style-type: none"> <li>• Acquisition of personal safety habits in dealing with animals</li> <li>• The student gets to know some pets, farm and wild animals</li> <li>• The student respects animals</li> <li>• The student places objects and himself/herself in space: inside-outside, in front of-behind</li> <li>• The student distinguishes spatial locations: open-closed</li> <li>• The student recognizes the elements of the whiteboard: white screen, computer, touch pointer, projector.</li> <li>• The student recognizes some basic elements of the computer: monitor, keyboard, mouse, speakers</li> <li>• The student properly turns the computer on and off</li> <li>• The student takes the mouse and the touch pointer correctly</li> <li>• The student drags items across the screen with the touch pointer</li> <li>• The student drags items on the screen with the mouse</li> </ul>



## **7.2. Early Childhood Education Curriculum and teaching ICT**

The curriculum of the 2nd Cycle of Early Childhood Education establishes that ICT promote education with sound, visual and audiovisual media (radio, photos, film, video, television, comics, video games, etc.) such as a teaching resource to develop the contents of the areas.

It should be noted that the use and incorporation of ICT in the educational project of the 2nd cycle of Early Childhood Education is included in block 4 “Audiovisual language and ICT” of the third area “Languages: communication and representation” of the curriculum of the cycle already named.



## ***METHODOLOGY***

### ***1. Authoring Tools***

The production process of a course is a difficult task that requires a lot of effort from computer programmers. In fact, it was out of the reach of most teachers for a long time. This complexity could be reduced by relying on appropriate computer tools that automate part or all of the production process for a course, creating authoring tools.

Authoring tools are those that allow, through a more or less complex compilation process, the generation of a program that works independently of the software that generated it. In a more specific sense, all those tools that allow generating activities, materials and resources in multimedia format can be included in this group. These facilitate instructional designers, educators, teachers, and learners to design multimedia educational materials without expert knowledge in computing (Dabbagh, 2001).

Authoring tools oriented to the educational field have as their main objective to allow the generation of content and/or digital educational activities. They are characterized by being easy to use. In addition, most are designed in such a way that those teachers who decide to use them do not require extensive knowledge of handling software tools or programming. They are usually friendly in their interface and intuitive to use when generating content and/or educational activities. They provide templates for displaying and organizing content, and/or templates for putting together activities. Each teacher can customize the templates they use according to the educational objectives that are set. As for content templates, you can find: virtual books, image galleries, audio and video players, among others; and with regard to activity templates: word searches, crossword puzzles, puzzles, crosswords, activities with Augmented Reality, questions-answers, tests, just to mention a few.

The general characteristics of authoring tools are:

- Ease of use: Some authoring tools on the market are not easy to use. Articulate, Captivate, eXelearning or Lectora, for example, despite being good tools, offer

the user complex handling. However, state-of-the-art authoring tools have made software creation in applications, easy to use. Templates, synchronized editing in the cloud or WYSIWYG technology (what you see is what you get) are some of the latest features that authoring tools offer the editor.

- Multi-device: Access from any device to share your e-learning courses on mobile, tablet or pc. Giving an automatic adaptation of the contents to the different devices, without losing an apex of utility and quality. The use of interactive content such as games, audios or videos and vertical navigation in Scroll for reading on smartphones, make it easier than ever to view and enjoy information.
- Interactive multimedia content: Make it easy to insert and retouch photos, audios, own videos or videos from platforms such as YouTube or Vimeo, or even gamification resources such as games or exercises. All these interactive contents capable of engaging students, together with well-written texts, make authoring tools for the creation of e-learning courses an advantageous option compared to other traditional tools.
- Evaluation to measure results: authoring tools allow students to be evaluated using final questions that, in addition to reinforcing concepts, serve to verify the success of the course among your audience. Very interesting metrics that will allow you to make the best decisions to modify and improve it over time.

Thus, a new class of software has developed over the years, the objective of which is to facilitate the creation, publication and management of digital educational materials to be used in e-learning. Using the software ARTICULATE Storyline 360, a teaching unit “pets, farm and wild animals” has been created: An attempt has been made to create animations in order to generate points of attention: put triggers (status, intersection of an object), buttons, add audios, videos and connections with web addresses. etc., all these resources allow you to help programming educational material, without having to write a single line of programming code as well. Likewise, questions have been created for students, using different types of questions, to obtain an overview of student learning and performance during the course. Lastly, the Teaching Unit has been published in Articulate 360, HTML5, Flash, word, CD, etc. to be used on computers, tablets, mobile phones, etc.

Unfortunately, authoring tools also have disadvantages:



- Sometimes they function as distractors of the true objective of the activity
- Limited versatility: you cannot always do everything you want with them, since they are generally templates and it is impossible to change some parameters
- Learning environment that hinders group contact as in a face-to-face class, in addition to the fact that many times the instructions are not understood correctly
- Training in the use of the tool: they require constant training and education of teachers.
- Technical problems
- Low availability of time to use them
- Wrong instructions
- Short-term obsolescence
- Cost, generally high

Furthermore, the commitment to use new technologies must meet certain technical requirements. The following computer applications are necessary:

- LMS (Learning Management System): It is an application resident on a web page server in which the formative actions are developed. It stands for Platform or Virtual Campus.
- LCMS (Learning Content Management System). It is an independent or integrated system with the LMS (Platform), which manages and administers the learning content.
- Authoring Tool. It is an application that allows us to design interactive content without the need of having programming or website design knowledge.

<b>CLASSIFICATION OF EDUCATIONAL SOFTWARE</b>			
			<b>AUTHORING TOOLS</b>
Distribution and management tools for courses and students	Communication tools	Storage tools	<b>Tools for creating educational materials and courses</b>
Learning content management systems (LMS, LCMS, CMS)	Mail	Educational Portals	<b>Tools for creating educational materials (images, sound, videos, text, etc.)</b>
Universities Virtual	Chat	Virtual resource centers	<b>Tools for creating and publishing courses</b>
	Forums	Repositories	<b>Simulation tools</b>

Table 1. Author: Gómez, J.I.A. & Almenara, J.C., Editores. Educar en Red. Internet como recurso para la Educación. Imagraf: Málaga, España., 2002.

Here are some of the technical characteristics of the best-known authoring tools:

- **Trivantis Lectora Inspire:** It can be downloaded in the computer or placed in the cloud. When you buy a Lectora Inspire license you also get a license for Camtasia Studio, which allows you to record screencasts and videos, it also includes the license for Snagit which is an excellent image editor. In addition, through the Lectora Inspire screenshot, you can migrate PowerPoint presentations and convert them into interactive presentations. You can also build games with HTML5 and Flash. With more than 2,0000 images, 50,000 characters and an extensive library of templates. You have the option to monitor the progress of the course to see if the student accessed, progressed and finished reviewing the



content. In addition, you can add buttons to be able to share on social networks and choose between 10 different types of questionnaires.

- **SmartBuilder:** This tool has won awards for its ease of use for creating e-learning courses quickly. You can create through action blocks that are joined in a logical and intuitive way. This tool uses a methodology very similar to Scratch. You can create multiple responses in one action. You can choose from a variety of customizable templates and work on the platform of your choice. This tool allows you to create your own templates, choose from those that appear or request the creation of one at no additional cost. You can also add action blocks and animations to add interactivity to your course. Plus, easily import your PowerPoint slides and choose from a great variety of quiz templates. You can use it on Windows or IOS.
- **Easygenerator:** Easygenerator is software that allows you to create e-learning in the cloud without the need of installation or download. It is easy to use. Once you have the design and content of your course you will be ready to publish it. Easygenerator has an intuitive interface and you don't need to know computer programming. The idea is that you can focus on the content of your course. You can follow the progress of your students in any LMS you choose.
- **Adobe Captiva:** It is a tool with robust capabilities to create virtual reality projects, and also to make quality interactive and HD videos. There is no spatial tool for creating conversation simulations, but it does have a module that allows you to build the simulation software using effects, triggers, and slide setting. Also, it has a geolocation tool, very suitable for geography courses. Learning curve: It is a tool with great capabilities, but its learning curve is quite steep. It is more suitable for experienced instructional designers. And it is compatible with Mac Os.
- **Articulate StoryLine:** allows you to create interactive courses in 5 different languages. You can easily integrate your Power Point slides and choose from a wide variety of templates. The courses can be published in HTML5 or Flash, which allows the use of “layers” and “triggers” that allow interactivity. Images, video and audio can be imported and integrated. It gives you the option to choose from an image bank of almost 50,000 options. You can download the software in your computer as a local file or use the online version. Articulate StoryLine 360



offers you 20 different types of questionnaires and also the option to make your own. The software is highly functional and if you have PowerPoint experience it will be easy to learn how to use it. Something to keep in mind is that there is no native version for Mac, but the content can be seen on Mac computers. One of the strengths of Articulate products is their usefulness. This is because Studio is as familiar to the user as Microsoft Powerpoint but with more templates, like StoryLine which is almost identical. Learning curve: It is a tool that has great content creation capabilities, but it takes time to explore them. It is necessary to invest time in training. And it is not compatible with Mac Os.

- **ISpring suite 8:** is an “add in” to PowerPoint and is not available as software. It is one of the best tools for creating e-learning content that is available at a much lower cost than others. ISpring is a local file that also requires a Microsoft license and converts your PowerPoint content into multimedia courses. Once the software is downloaded to the computer, you can easily explore its functions. You can add audio, video, take quizzes, record your screen, and create interactions. There are 23 different types of questionnaires. You can record audio directly from the application, although it does not have many video editing tools. With the simulation function you can make “include your own adventure” type material in which multiple options are displayed among which the student chooses. The content can be published in SCORM to be able to integrate it within the LMS. It can also be published on an HTML5 web page and is compatible with the Tin Can API. ISpring suite 8 is a good option for those who have extensive content developed in PowerPoint, who know how to use it well and for those who create their content by themselves. Compatible only with the Windows operating system, it can be used on Mac through various tools suggested by the developers. It is also a useful tool for creating e-learning modules. Learning curve: Most of the comments, rate from this authoring application the fluent integration with PowerPoint and its ease of use. In addition, it does not work without PowerPoint and it is not compatible with Mac Os<sup>3</sup>.

<sup>3</sup> For more authoring tools, see the following link:  
[https://www.capterra.es/directory/31278/elearning-authoring-tools/software?sort=overall\\_rating](https://www.capterra.es/directory/31278/elearning-authoring-tools/software?sort=overall_rating)



## **2. What is *STORYLINE 360*?**

Articulate 360 is a computer software. It was devised in 2004 as Articulate Quiz maker 1. Articulate 360 is used to carry out e-learning courses that have simple mechanisms to use. It has been proved that this computer program aims to promote interactivity and the stimulus-response relationship in learning.

The basis of using this program is to devise a story related to a certain didactic topic of the course and show it through branching contexts with graphics, drawings and content using the Articulate 360 program as an e-learning tool. When the student already knows one topic, this program serves to strengthen his/her knowledge by providing useful scenarios for developing the skills of the participants. Each section of the scenario is organized sequentially so that the participants get involved. They apply critical and creative thinking skills to finally be able to make decisions and thereby solve problems.

Storyline 360 is the latest version of Storyline, Articulate's authoring tool for creating interactive courses. This version is more compatible with mobile devices than the previous ones, which makes it more available. With Storyline, you can create manual courses by choosing slide templates and inventing interactions.

The Articulate content is very useful since it has a multitude of photos, templates, icons and characters to create the courses. It is remarkable that hundreds of slide templates can be chosen to perform the interactions the course designer comes up with. There are also videos, characters, and simulations to create visual learning experiences.

On the one hand, due to the peculiarities of the Storyline program, students can interact on all the slides in an active and attractive way, since they can click, drag and drop with the mouse. The characters used in the program can be taken from the large file you have or can be created by the designer of the work and the questions included in this one can be obtained from 25 sorts of questions that the program contains. On the other hand, it is



very interesting that at the end of the work there is the option of registering the obtained results cumulatively.

In addition, Storyline has been in the market for many years, this has made it have been improving and specializing in e-learning so that a large number of interactions can be carried out and that can be used in a simple or more specialized way to carry out practices that give the users experience in more complex elements. Also, the main advantage of using it is that you can update the content whenever you want.

Notably, users who use Storyline at the beginning will require a lot of time to make their creations, but in turn when they have finished the work they will have a good e-learning experience. The Storyline base is linear. Referring to the navigation of the software is restricted, since you must have a license to use the program.

### **3. What does *ARTICULATE 360* include?**

Articulate 360 contains the applications and resources necessary to create an interactive e-learning course that can be used on any device.

Storyline 360 is an application that facilitates the creation of courses that allows you to develop e-learning that responds to any device. It adapts to the screen of phones and tablets, adjusts to each screen size and orientation and allows users to zoom in a content. Articulate Review is a very useful web application that allows you to receive opinions and comments about the course. To verify what others think about the course, what you need to do, is publish it from Storyline 360 to Articulate Review and send a link to the interested parties.

On the other hand, as already mentioned, Articulate 360 includes a content library that allows you to create electronic courses using many resources such as icons, photos, templates, illustrations or characters. There is also a large selection of videos to choose from.

The Articulate 360 software offers the opportunity to learn how it is used online, so you can enter as many times as necessary. Live seminars help you learn how to use it, and you



can ask questions to solve the problems that appear throughout the design of a course or activity.

#### ***4. Publication format***

I have selected authoring tool offered different formats (Review Articulate 360, Web, Video, Articulate online LMS, CD, Word). Without doubt, the e-learning market has experienced uninterrupted growth in recent years, which has been accompanied by a wide variety of platforms and applications developed by various producers. The variety of LMS and content is as wide as the number of producers of this type of product. For this reason, it is necessary a regulation that makes the different systems and courses compatible, facilitating the achievement of two main objectives: that a course from any producer can be loaded in any LMS from a different one and that the results of the activity of the users in the course can be registered by the LMS.

For this reason, in recent years, e-learning has been subjected to a standardization process that undoubtedly had to be known by me, in order to choose the format of the publication of the “e-learning didactic unit”. I must say that the first version of the unit that I sent to my End of Degree Dissertation Director was in the form of a video, this publication being non-interactive and far from the objective of active e-learning that I intended to pursuit.

Reading various manuals of the authoring tool and revisions of the computer data publication formats, revealed that there had been a chronological development of the e-learning standards that had in the AICC (Aviation Industry CBT Comitee) its start point. Its main advantage is the interdependence of contents regarding platforms. Subsequently, other standards emerge, such as the one promoted by the IEEE LTSC (Learning Technologies Standards Committee). What they did was collect the work of the AICC committee and improve it, creating the notion of Metadata. The IEEE witness was collected by the IMS Global Learning Consortium, Inc. Its goal was to create a format that would put into practice the IEEE and AICC recommendations. To do this, it defined a type of XML file that describes the contents of the courses. So that any LMS can load the course by reading its configuration file. And we come to the ADL, which is an agency created by the North American Administration that collected “the best” from the previous initiatives and recast and improved them into its own standard: SCORM, (Shareable



Content Object Reference Model). Regarding website accessibility, the guides and tools promoted by the W3C (World Wide Web Consortium) stand out.

In this case, in order to show the online didactic unit that I had developed, to my End of Degree Dissertation Director, I learned that publishing as a CD generated a ZIP file that, when extracted with any file decompression software, allowed me to see a ZIP file, which if the individual files are extracted, the file “Launch\_Story.exe” allows dynamic and interactive publication of the content of the modules of the didactic unit. Although the application can also publish in LMS (SCORM) and HTML (WEB) formats.



## ***RESULTS***

It is recommended that to design a course with Storyline, the teacher puts himself/herself in the student's place and design it from the student's perspective. Teachers must value what the students should have learned at the end of the course or from a didactic unit, that is, the knowledge or the ability they must have to solve certain problems. For this, teachers must ask themselves how will the student use the information in the course that has been designed, in order to later obtain good performance expectations. When the teacher has decided the objectives of the course and what does he/she expect of the students, the teacher must order the content of the course and know the information that the student needs to fulfill these objectives.

On the other hand, one of the realities of using electronic teaching at school is to put the knowledge acquired by the student in contact with the real world. Why does the student need to know this information and how will he/she apply it later. One of the scenarios that could be carried out in a certain activity would be the real world, from here information will be provided to the student and he/she will have to make decisions based on the information they have. Finally, it would be very suitable for pupils to count with a feedback system.

Moreover, taking an e-learning course can be very time consuming, so the teacher should keep in mind that the activity or course that he/she proposes the students should not be too complicated for them. They should use the resources they have in the best possible way and be able to complete the course or didactic unit easily.

Besides, the objectives of taking electronic courses include sharing information and verifying that the students have the adequate knowledge to complete them out and implement their academic performance. With this in mind, it can be said that there are three different models of e-learning courses.

1. The first model is based on communicating information exclusively, without evaluating student performance.



2. The second model is based on giving step-by-step instructions so that they have specific results. This type of course would serve to learn how to do something in a practical way.
3. The third model is based on sharing guidelines to help the student solve problems.

The person who designs the work, which in this case is the teacher, is responsible for making an attractive design for the student with colors, photographs, images, animations, sounds, etc. All this influences the perception of the course by the student.

In the other hand, a possible disadvantage of the design of this courses is that when the content is transmitted to the students, they are all supposed to need the same information and sometimes this is not real. In addition, sometimes the learning capacity is different for some students and it may not suit their needs. This means that he teacher has to analyze the content that the students need in general and provide the same information for everyone, although the experience of using the application will be unique for each student.

However, the teacher will always work with the same basic content, the only thing that changes with this way of working is the way it reaches the student. The teacher instead of creating a content outline, should ask himself/herself how to get students to reach certain information. He/she should do it in a simple way, either by asking easy questions or designing activities that solve problems with a solution. As well, the teacher must create the need for information so that the student can satisfy it, moved by motivation. In other words, the teacher shares the information and creates a unique learning need for each student. Thus, as it has been said before, the objective when designing an e-learning course is for the student to have a new experience that will make the subject in question become important to him/her.

Using the software ARTICULATE Storyline 360, a teaching unit “pets, farm and wild animals” has been created which is included in the second area of the curriculum of the 2nd Cycle of Early Childhood Education: “The physical, natural, social and cultural environment. ”



The didactic unit is made up of seven modules:

1.Presentation, 1.2. Pets, 1.3. Wild animals 1.4. Farm animals 1.5. Body parts 1.6. Animal sounds 1.7. Play more

In the development of the modules, an attempt has been made to create animations in order to generate points of attention: put triggers (status, intersection of an object), buttons, add audios, videos and connections with web addresses. etc., all these resources allow you to help programming educational material, without having to write a single line of programming code as well. Likewise, questions have been created for students, using different types of questions, to obtain an overview of student learning and performance during the course. Lastly, the Teaching Unit has been published in Articulate 360, HTML5, Flash, word, CD, etc., to be used on computers, tablets, mobile phones, etc.

Below we collect the physical publication of the contents of the modules in Word and a ZIP file, which if the individual files are extracted, the file "*Launch\_Story.exe*" allows dynamic and interactive publication of the content of the modules of the teaching unit "Pets, farm and wild animals".





## ***DISCUSSION***

In the course of the discussion the questions that have arisen during the completion of the End of Degree Project in Early Childhood Education Teaching specialization will be answered, as well as the proposed solutions.

### **1. E-learning creation tool to use**

During the Double Degree in Early Childhood and Primary Education- specialization in English (PIMM) at the UCV, I have had the opportunity to become familiar with the use of LMS (Learning Management System) and LCMS (Learning Content Management System) tools. The completion of the End of Degree Project in Early Childhood Education Teaching specialization seemed like an excellent opportunity to familiarize myself with the Authoring Tool resource.

Authoring tools are used for software development and enable educators, teachers and students to design an interactive multimedia course and hypermedia learning environments without knowing programming languages. Authoring tools are aimed at educational applications that contain a particular task model in which the end user must be occupied (Santos, 2000; Dabbagh, 2001; Gómez et al., 2014; Sánchez, Tabares, Londoño & Duque, 2018).

The main advantages of these systems for Early Years teachers are: reduce working time, made easier and faster to learn languages, can be used for applications with a wide variety of content, improves the quality of teaching by the teacher and student and updating of pedagogical methods both individually and in groups.

### **2. The most user-friendly**

Reading various reviews and opinion articles has allowed me to answer the question. Thus, according to *PC Magazine*, Articulate StoryLine 360 is the number one tool for its ease of use and for having video, audio and design editing options. Another publication, *E-learning Guild* (<https://www.elearningguild.com>), has developed different sessions in



which it analyzes which is the most suitable authoring tool, indicating that the majority of users chose “StoryLine” as a program they would like to work with, the second was Captivate and Lectora the third. For all these reasons, the conclusion I reached was that, although the choice will depend on the user, the nature of the course, the continuity with the provider's catalog, the student, etc., one of the most recommended was StoryLine.

Therefore, I decided to carry out the “e-learning didactic unit” in the Articulate StoryLine 360 authoring tool. To do this, I contacted Prof. Dr. J.L. Ortiz from the Department of Pharmacology of the Faculty of Medicine of the University of Valencia, who had presented various communications to conferences on teaching innovation on the use of the authoring tool Articulate StoryLine 360 (Proyecto de Innovación Educativa de la Universitat de Valencia: *Farmacocinética para médicos*. Plan Renovación de metodología docente para el curso 2017-18 de la Universitat de Valencia).

### **3. Advantages of doing the teaching unit in Articulate StoryLine 360 compared to doing it in PowerPoint**

For years, e-learning tools have been based on a PowerPoint slide paradigm, for this reason, it can be believed that PowerPoint presentations are the same as authoring tools. In order to justify its selection as a technological resource, I list the differences between both resources:

- A PowerPoint presentation is not a course; it is a presentation. You need a presenter.
- A PowerPoint presentation is not interactive. In a PowerPoint presentation, the best the student can do is turn the pages back and forth.
- A PowerPoint presentation is not mobile friendly.
- A PowerPoint presentation is very difficult to gamify.
- A PowerPoint presentation does not allow you to track your students. Knowing what they do, how they progress, how long they take to complete activities and how they score on tests are important aspects.
- A PowerPoint presentation is not sequential. When a student views an authoring tool, they can jump to any page without reading the previous ones.

- A PowerPoint presentation does not allow you to agilely manage an evaluation test. If you add the test in the presentation itself, they will have to be returned to you by email or another manual channel. Students will take time to know their results, which is not very optimal. On the other hand, when you build a course with an authoring tool, you can add an evaluation test that incorporates a feedback per question and a final feedback, in which students are informed if they have passed or not and with what grade (depending on of the minimum grade that has been established). In addition, you can add a bag of questions and only show some randomly, which will make it difficult for students to copy or learn the answers to put them correct on a second attempt.

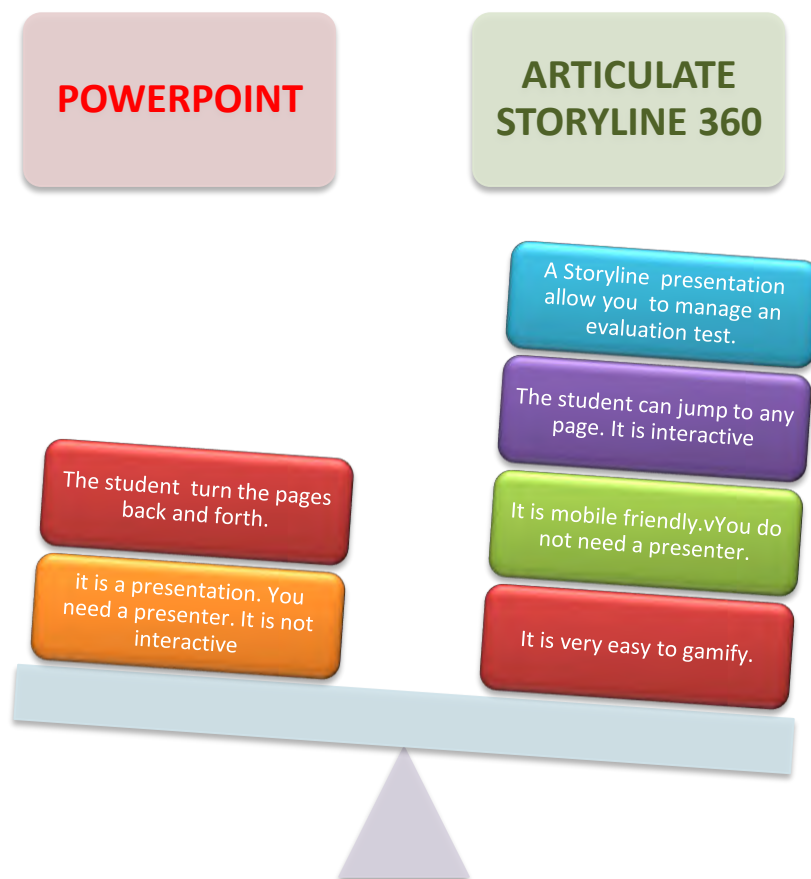


Figure 7. Advantages did the didactic unit in Articulate StoryLine 360.

#### 4. Educational model to be used

The educational model proposal will be through an ICT support process, that is, through the use of digital tools, but face-to-face. As it is a school environment, students must



attend class. They will be together in the classroom and will work in unison the activities. Although at a certain time their tasks will be diversified.

Activities are repeated in the different modules, since repetition in Early Childhood Education is the basis for learning, skills development and achievement. When we speak of repetition we are referring to any working methodology that provides the child the opportunity to repeatedly practice a skill or area of knowledge. Learning consumes energy to develop neural connections. In adults, these neural connections are well developed based on previous experience, repetition, and practice. This allows us to do things like drive a car or solve basic math problems with very little energy consumption. The less automatic the process is, the more energy we need for neural connections. In children, these neural connections are forming. The child must learn the fundamental skills before he can gain speed, confidence, and mastery of a specific skill, so through repetition, the ability to do something becomes skill.

Here are some reasons why repetition at Early Childhood Education is important (León-Carrión, 2010):

- Repetition helps strengthen the brain's neural processors for learning. Teaches children to practice, master, retain and reinforce knowledge.
- Repetition is necessary for mastery of skills and success
- Children learn self-discipline and critical reflection through repetition
- With the repetition of movements coordination is improved in children
- Children, through repetition, learn to differentiate variations and differences in the world around them
- Through repetition the confidence necessary to progress is developed
- Repeating, concepts are internalized

The unit has activities like “What animal is this? What is the name of...?”, which repeat a pattern. This is, on the one hand, positive for pattern consolidation when you are listening and for feeling confident that you can be able to handle it. Also, these activities are repeated in the other blocks. I recognize that depending on when students complete the modules, it can be “boring” to have the exact same type of homework. However, I have to argue that repetition at this age helps to consolidate learning.



## **5. Techno-pedagogical design to be used**

In general, the design of the environment should be simple and intuitive, since it will be the students themselves who will manage the “e-learning didactic unit”. Students whose age ranges between 4-5 years old and must be able to handle it by themselves. I also consider that it must have an attractive and motivating appearance, with many images, drawings and colors strategically disposed so that it facilitates the route that students must follow in the teaching-learning process.

## **6. Online learning model**

Once the computer tool was chosen, it was necessary to decide which e-learning model was going to be used. Of the different models to approach online training: technology-centered, teacher-centered, student-centered, content-centered and focused on peer interaction. It seemed to me that since my student population was going to be girls and boys between 4-5 years old, it seemed clear that those models focused on content, on interaction between equals, on the teacher and on technology were not appropriate (Martínez, Morales, Aparicio & Ortiz, 2019).

For this reason, the proposed online training should follow a model centered on the student. Bearing in mind that in training through the web, pedagogical quality and the emphasis on personalized support must be taken into account. According to Stephenson and Sangrá (2006), the students are not supposed to be empty recipients, but come with their own perceptual frameworks with different ways of learning. Learning is an active dynamic process in which connections constantly change and its structure is constantly reformatted. For this reason, a student-centered approach leads us to a didactic strategy in which the teacher works with students to determine the most appropriate learning strategy for each of them and thus apply it individually according to the needs of each student.

Without pedagogical quality and without personalized support, the students will hardly be able to carry out their own learning, since, although they make a great effort to carry



out the course, it is necessary to apply some minimum guidelines and a guide that indicates what they should do in order to complete it.

## **7. Content of the didactic unit**

The main materials that have been used for the work with the students are digital resources collected from specialized websites (Appendix II contains the results of the search carried out on digital resources for English resources, Science resources, Digital creation resources and ICT resources in the classroom).

For this, the school environment and the contents to cover have been taken into account, in this case those corresponding to the teaching unit “Pets, farm and wild animals” which is included in the second area of the curriculum of the 2nd Cycle of Early Childhood Education: “The physical, natural, social and cultural environment.” In addition, the didactic unit consists of seven modules:

1. Presentation
- 1.2. Pets
- 1.3. Wild animals
- 1.4. Farm animals
- 1.5. Animal body parts
- 1.6. Animal sounds
- 1.7. Play more

In order to fulfill the objectives and skills indicated in the didactic unit, simpler and more complicated resources have been included so that, among all, they perform the functions of reinforcement or review, consolidation and some expansion in order to fulfill the objectives of the unit to their full extent. Subsequently, the level of demand in the evaluative survey responses will depend on the students’ cognitive abilities, not on everything they have heard and worked on in class.

## **8. Evaluation of the didactic activity**

For a long time, students and tutors have assimilated evaluation to measurement, considering as the purpose of the evaluation to qualify by means of the results obtained



in taking exams. However, the concept of evaluation is much broader: while measuring implies an assignment of values, evaluating also means establishing judgments derived from those measurements in order to interpret them and draw conclusions. Therefore, assessing is one of the most important stages in the teaching-learning process since it establishes the achievements that have been made throughout the educational process (Martínez, Morales, Aparicio & Ortiz, 2019).

The techniques are specific and particular guidelines or procedures for action that are used to develop the evaluation or that allow the evaluation of certain skills or knowledge. To verify that the student has got it right or has learned anything, questions of different types have been introduced throughout the application. The most important techniques and tools in online training are multiple-choice, dual-alternative, pair-matching, gap-filling, ordering, identifying, sorting, and exercise and game questionnaires. There are studies in the literature that propose taking tests as the basis for the continuous evaluation of a subject, and the results of which show that these tests, made up of multiple-choice or short-answer questions, positively influence the learning process of students (Einstein, Mullet, & Harrison, 2012). Every time a module is delivered, a small exam is done on it, allowing the student to know the errors and correct them.

## **9. The best time to check the mistakes made in the evaluation**

Two paths for feedback could have been chosen, immediate, allowing the student to have a second or third opportunity to answer, or at the end of the unit. When having not reached the percentage of correct answers, the student has to repeat the entire evaluation or unit.

In this model, three options have been used:

- The deferred option has been used, so that at the end of each module there is information on the results, making it possible to review the errors and repeat the module or evaluation again.
- It has been used the option that allows in the face of an incorrect answer, the tool to refer the student to the slide where the asked concept or knowledge was.
- It has been used the option to “retry”, where the student decides to complete the activity again.



Figure 8. Student evaluation. Retrieved from Articulate Storyline 360.

## 10. Improve student motivation

One concern that arose during the development of the e-learning didactic unit was that I had to assume that, at first, the experience may be hard for students, the temptation to “run away” is easy and does not require explanations, just “click” the exit button with the mouse. The feeling of loneliness and demotivation strictly affects the emotional field of the student and directly affect the success or failure of the training action in online teaching. Therefore, it will be imperative to keep it in mind and manage it effectively throughout the period of the training action.

To ensure that there is no demotivation, it will be very useful to follow these criteria: offer an accessible and easy-to-use method, include means to receive feedback and use reinforcement and advice.

The fact that on the Internet the contact between the student and the rest of the classmates, or between the student and the tutor, most of the time is not carried out in a habitual way, can cause the student a feeling of being alone or of not being heard. This feeling may even lead the pupil to leave the course or not participate as often as necessary. To avoid the feeling of loneliness, the teacher must be accessible and close, respond quickly enough to the pupil’s requirements and encourage group or collaborative work, promoting



activities that promote social relations among students. Despite the fact that the tutor cannot control all the variables that cause demotivation, he/she must do everything on his part to control the student's leave and prevent it from occurring. It is important for the teacher to monitor the attendance of students individually and frequently, to encourage participation in the proposed activities, to make frequent communications with the students, or to constantly reinforce and encourage them.

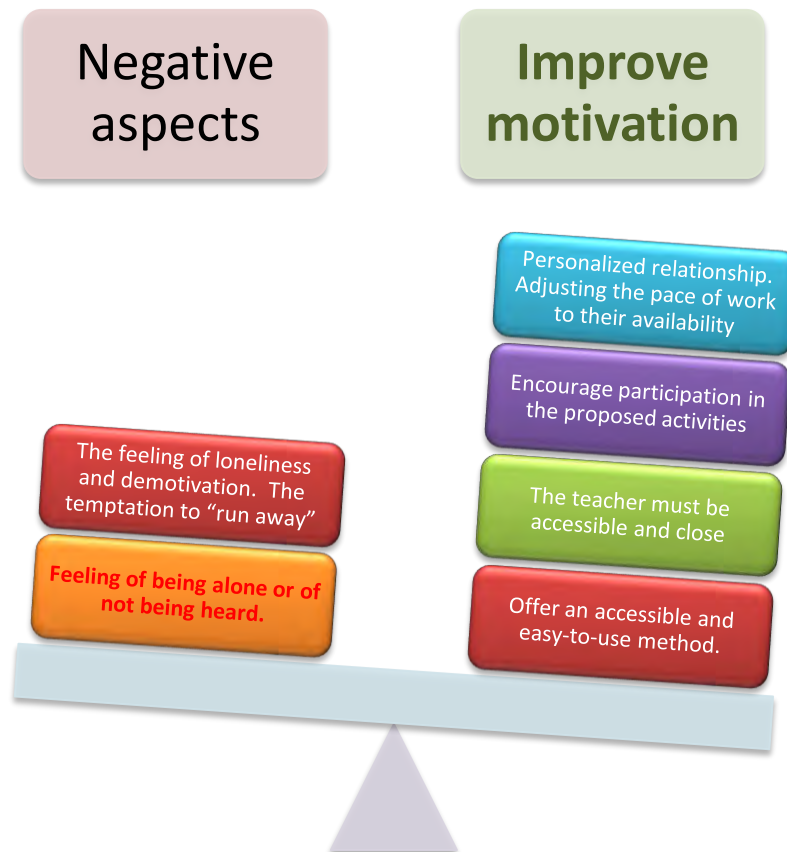


Figure 9. Improve student motivation.

The tutor must monitor the progress of each student's work, know the capabilities of each and adapt to them. The monitoring of the student must be personalized. Contrary to classroom teaching where tutoring is normally carried out at the request of the student, the action of the tutor in online learning must be active and anticipate any problems that may arise. The tutor communicates with the students in such a way that he/she must know their weaknesses and needs, follow their evolution and take communication initiatives. That is, he/she must carry out a personalized relationship following the student's progress, evaluating their successes and failures, adjusting the pace of work to their availability,



and to propose them different forms of harnessing and time management (Gutiérrez & García, 2016) (Elizondo, Rodríguez, & Rodríguez, 2018).

In a practical way, throughout the authoring tool, my voice and my image are incorporated, as well as my “teacher assistant dog, Jocker” (my dog). I consider that being able to hear my voice and that there is a virtual teacher during the development of the unit it is something very positive, which brings closeness to the students and creates empathy towards the person who is guiding them.

## **11. Evaluation of the learning action**

For the evaluation of a training action as a whole, what is done is to evaluate each of its participants and other elements such as methodology, virtual environment, etc. (Martínez, Morales, Aparicio & Ortiz, 2019).

- Teacher evaluation

I) The external evaluation is carried out periodically by the students, through tests or surveys, in which the following aspects will be analyzed: the teacher masters the subject, solves the doubts, takes into account ideas and suggestions and is involved in the learning process.

II) The internal evaluation by the teaching team only differs from the external evaluation in that the relationship with the teaching team is valued.

- Evaluation of online content, documentation and materials. General satisfaction with the course contents, current content, correct sequentiality of the topics, adequate extension of the topics, complete and well-structured information, clear and sufficiently self-explanatory documentation accompanied by graphics, drawings and examples.
- Evaluation of the methodology and activities. Adequate volume of activities during the course, easy understanding of the working method, sufficient support in the learning process and adequate degree of difficulty.
- Evaluation of the virtual environment: easy to use system, quick loading of pages and easy access to services and information.



The exceptional situation that occurred in Spain and the rest of the world from March 14<sup>th</sup>, 2020, has made it impossible to implement the model of the “e-learning didactic unit for Early Childhood Education students (5 year olds): Pets, farm and wild animals” here proposed, with real life students and therefore there is no data available for the evaluation of the training action.

## **12. Articulate StoryLine 360 learning curve**

The handling of this authoring tool is a challenging task. Now I understand the nuance that made the different comparative studies, about that it takes time to explore the content creation capabilities of the tool. It is necessary to invest time in training.

## **13. Automatic or manual presentation**

The application can go from one slide to another automatically (once the slide timeline has elapsed) or manually by a command of “pass to the next slide”.

At first, I considered that given the age and computer skills of Early Childhood Education students, it would be more appropriate to choose the automatic option, so that the computer system would go independently to the next slide. The duration of the slide's presence was determined by the slide's timeline, which includes the duration, the moment of entry and exit of the different components of the scene (text box, caption, images, audio, etc.). Reached the point marked as the End, it would automatically move forward to the next scene.

However, when - once finished - I published the unit, I was able to verify that the automatic form had a great disadvantage: it could favour the student's feeling of loneliness and demotivation. Thus, if the length of the timeline was short, the students with greater difficulty could not internalize the knowledge of the scene. On the contrary, if it was a long time, the students with higher level of knowledge and foreign language would disconnect quickly. This made me decide to reconsider the user-dependent option of the authoring tool. It is the child who, according to his abilities, decides when he/she passes



to the next scene, independent of the timeline of the scene, who will only regulate the moment of entry and exit of the different components of the scene.

#### **14. Extension of the e-learning teaching unit**

At first, I considered that it was convenient for the student to continuously follow the application, that is, to continuously view the 170 slides that compose it. For this, a tree structure was designed where the different paths that the student could take according to their interaction with the tool were determined.

However, when - once finished - I published the unit, I was able to verify that the continuous form had a great danger: the boredom of the student, who had to watch the slides pass automatically “facing the computer” for about 70-100 minutes. This led them to be tempted to “disconnect/log out/exit”. Since, it is just necessary to “click” with the mouse and exit the application.

Therefore, this made me reconsider the design of the model of the “e-learning didactic unit for Early Childhood Education students (5 year olds): Pets, farm and wild animals”. Finally, the unit was divided into seven independent modules, so that the student could learn different fractions of the unit each day. Likewise, each module has its evaluation incorporated, which -as I have indicated before- allows to review and repeat the module and/or the questions it incorporates.

#### **15. Student interaction with the tool**

Authoring tools are appropriate computer tools that automate part or all of the production process for a course. Therefore, in this case, the objective of the authoring tool is to help generate “an e-learning didactic unit for Early Childhood Education students (5 years old) of pets, farm and wild animals”. Whose purpose is that the student learns the contents of the unit (what) through their own interaction with the program through the games, questions, videos, audios, etc., that the tool offers them. And the time dedicated to “how” and “with what” must exist, but cannot overcome, the need to learn the contents, the “what”.



For ICT to have an educational use they must be used correctly, for this, it is essential that they be used as a means and not as an end. They should help expand what students are learning and make them to continue exercising the memory. Since the fact of having the information through the Internet or search engines is preventing it from actually exercising. All this is complicated because the students think only of their playful use and do not understand that ICT is a tool to develop learning.

In sum, I consider that the slides with academic content are the core of the unit and should be “studied” by the students.



## ***CONCLUSION***

In the development of this work, its general objective has been achieved: Use an authoring tool to design a Nutrition teaching unit. Likewise, the specific objectives have been achieved: choose the authoring tool, explore information on natural sciences, design resources in the authoring tool to generate points of attention for the student, generate in the tool an integrated evaluation of the student and publish the didactic unit in CD and word format.

Once this work is finished, it could be concluded that of the authoring tools, one of the most used is Articulate StoryLine 360, however, it could be indicated that its learning curve is steep and needs a training period to design a didactic unit . Throughout the development of the End of Degree Project when designing the didactic unit, different approaches have been made, reaching the conclusion that it must be used manually by the student, subdivided into modules, must have the possibility of evaluating it and being able to published in HTML5, Flash, Word, CD, etc., to be used on computers, tablets, mobile phones, etc.

Likewise, it is very important to generate points that implement the student's attention, for example putting activators (state, intersection of an object), buttons, adding audios, videos and connections with web addresses, etc. Questions should also be created about the teaching unit that students have to answer and that will provide an overview of student learning and performance during the course.

It is important to emphasize that the teacher with his spoken voice must accompany all activities so that the student feels more motivated and emotionally close to the teacher.

The continuation of the present work would be the implementation of the didactic unit in real life, that is to say, it would be used by the children to whom this didactic unit would correspond, obtaining feedback from the children and their tutors, to ratify that it contributes to the strengthening of the pedagogical practice of teachers and at the same time to student learning.



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## APPENDIX I

### 1.1. Presentation

#### “Pets, farm and wild animals”

#### 1.1.1

You are going to learn about...



Paula Cortijo Sanz



Enjoy yourself!!

You are going to learn about...




Paula Cortijo Sanz




Enjoy yourself!!

next slide

#### 1.1.2




JOKER



Hi !!!  
I introduce you my dog.  
His name is JOKER.

#### 1.1.3

He will be my assistant in this class.  
He is doing dog teacher assistant practices!!



#### 1.1.4

He likes to sleep a lot, but he is a hard worker when he is awake.  
So you have to call him from time to time !!!!!

Let's call him !!!!




#### 1.1.5

Let's call him !!!!!

JOKER !!!

JOKER !!!

JOKER !!!

#### 1.1.6

JOKER !!!

Hi, I am Joker!  
I am going to pretend  
I am sleeping!



#### 1.1.7

At the end  
I had to  
wake up!



#### 1.1.8




THIS DIDACTIC UNIT IS ABOUT THE DIFFERENT SORTS OF ANIMALS, THEIR NAMES, THEIR SOUNDS, THEIR BODY PARTS AND ABOVE ALL PLAYING WITH THEM.





#### 1.1.9

ANIMALS

PETS

WILD

FARM

#### 1.1.10

Listen to the sounds  
and tell me what  
animals are they!

PLAY

PLAY

PLAY

PLAY

PLAY

PLAY

STOP SOUNDS



#### 1.1.11

PET

PUT EACH ANIMAL IN ITS HOUSE

HOUSE

WILD

FARM

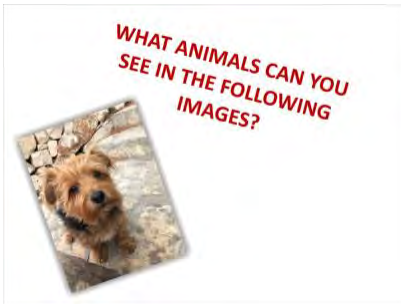









**1.1.12**



**1.1.13**



**1.1.14**



## 1.2. Pets “Pets, farm and wild animals”

### 1.2.1



### 1.2.2



### 1.2.3



### 1.2.4



### 1.2.5



### 1.2.6



### 1.2.7



### 1.2.8



### 1.2.9



### 1.2.10



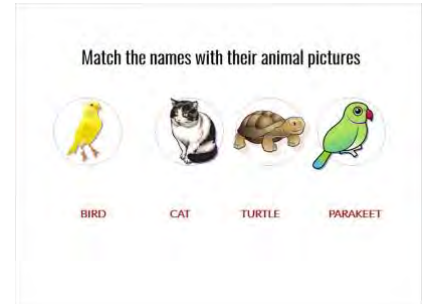
### 1.2.11



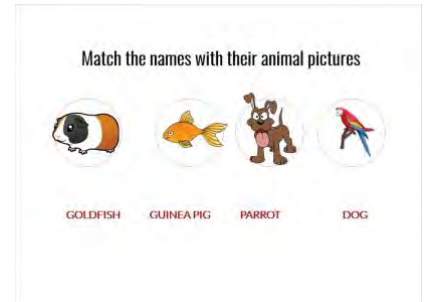
### 1.2.12



### 1.2.13



### 1.2.14





1.2.15



1.2.16



1.2.17

Please, first of all, listen to the sounds and then choose and think if the animals are:

- pets,
- wild animals,
- or farm animals.

1.2.18



1.2.19



1.2.20



1.2.21



1.2.22



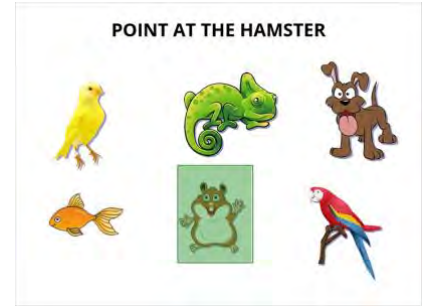
1.2.23



1.2.24



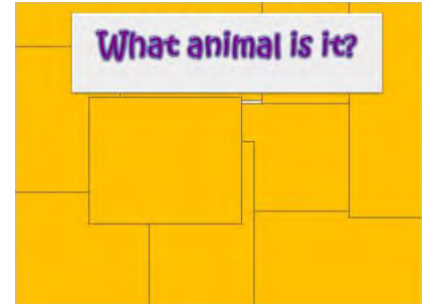
1.2.25



1.2.26



1.2.27



1.2.28



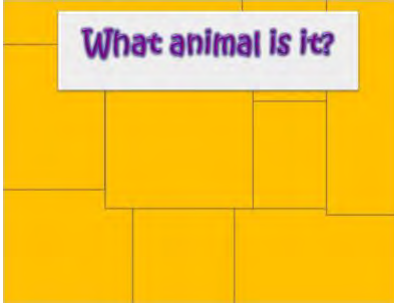
1.2.29



1.2.30



1.2.31



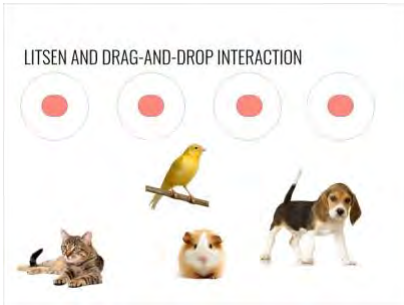
1.2.32



1.2.33



1.2.34



1.2.35



1.2.36



1.2.37



1.2.38



1.2.39



1.2.40



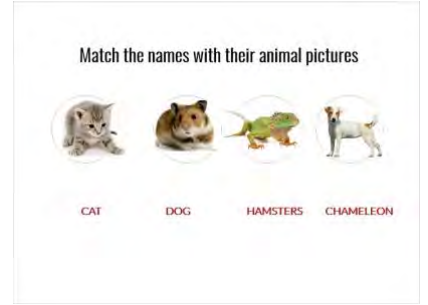
1.2.41



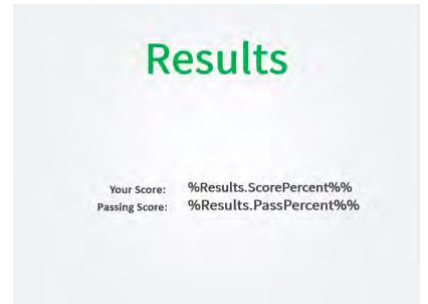
1.2.42



1.2.43



1.2.44





### 1.3. Wild animals

#### “Pets, farm and wild animals”

1.3.1.



1.3.2



1.3.3



1.3.4



1.3.5



1.3.6



1.3.7



1.3.8



1.3.9



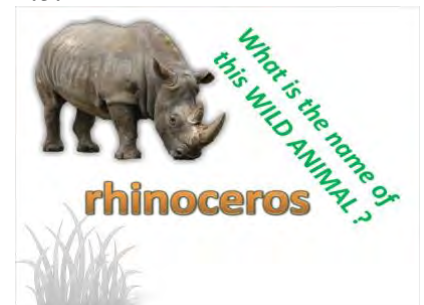
1.3.10



1.3.11



1.3.12



1.3.13



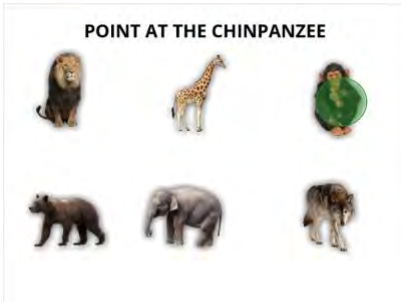
1.3.14



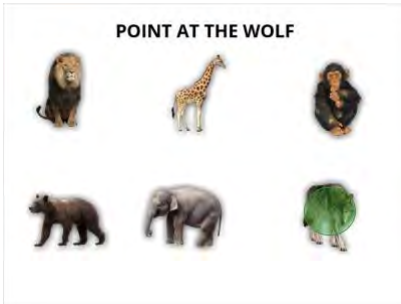
1.3.15



1.3.16



1.3.17



1.3.18



1.3.19



1.3.20



1.3.21



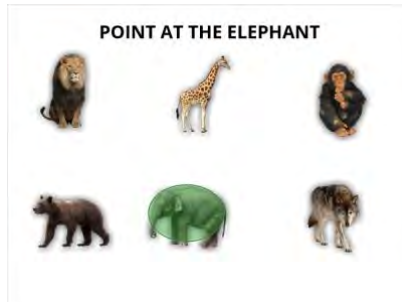
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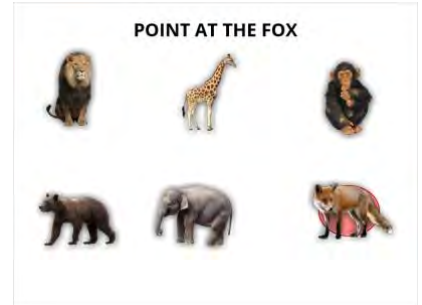
1.3.23



1.3.24



1.3.25



1.3.26



1.3.27



1.3.28



1.3.29 SEAL





1.3.30

What is the name of this WILD ANIMAL ?

**OCTOPUS**



1.3.31

What is the name of this WILD ANIMAL ?

**DOLPHIN**



1.3.32

What is the name of this WILD ANIMAL ?

**SEAHORSE**



1.3.33

Match the names with their animal pictures



LION HIPPO EAGLE SNAKE

1.3.34

Match the names with their animal pictures



DOLPHIN SEAHORSE OCTOPUS SHARK

1.3.35

Match the names with their animal pictures



FOX CHIMPANZEE RHINOCEROS ZEBRA

1.3.36

Match the names with their animal pictures



CHEETAH TIGER PENGUIN OSTRICH

1.3.37

WILD ANIMALS GAMES



1.3.38

What is the name of this WILD ANIMAL ?



1.3.39

What is the name of this WILD ANIMAL ?



1.3.40

What is the name of this WILD ANIMAL ?



1.3.41

What is the name of this WILD ANIMAL ?



1.3.42

What is the name of this WILD ANIMAL ?



1.3.43

What is the name of this WILD ANIMAL ?



1.3.44

What is the name of this WILD ANIMAL ?



1.3.45



1.3.46



1.3.47



1.3.48



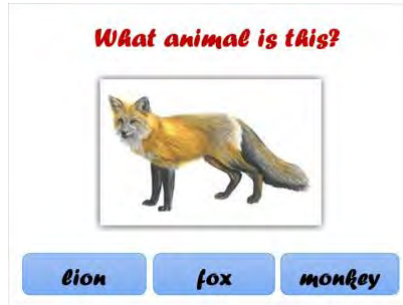
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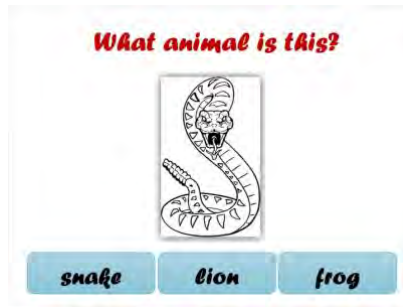
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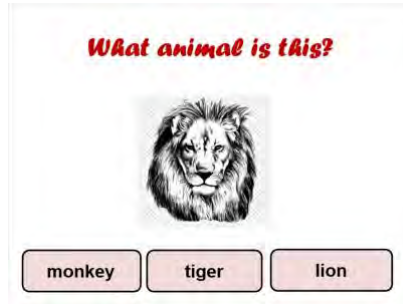
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1.3.52



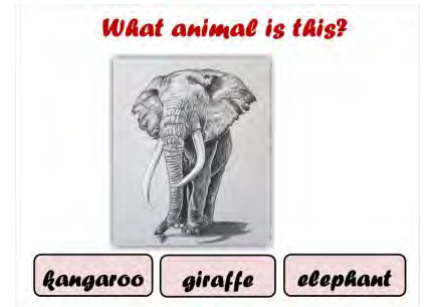
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1.3.54



1.3.55



1.3.56



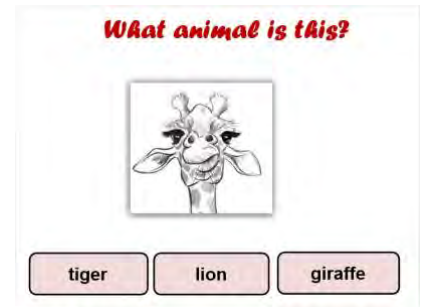
1.3.57



1.3.58



1.3.59





1.3.60

**What animal is this?**



fox      wolf      lion

1.3.61


**What animal is this?**



lion      tiger      koala

1.3.62

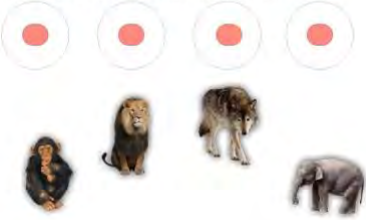
**What animal is this?**



monkey      lion      bear

1.3.63

LITSEN AND DRAG-AND-DROP INTERACTION



1.3.64

**QUIZ RESULTS**



YOUR SCORE: %Results.ScorePercent%%  
PASSING SCORE: %Results.PassPercent%%

REVIEW    PRINT    RETRY



## 1.4. Farm animals

### “Pets, farm and wild animals”

1.4.1



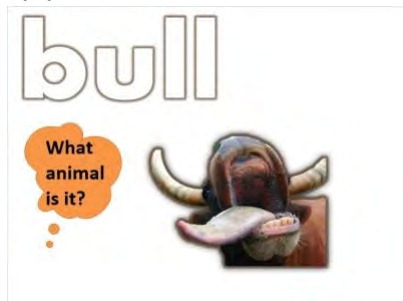
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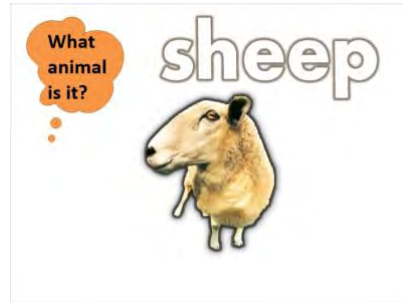
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1.4.4



1.4.5



1.4.6



1.4.7



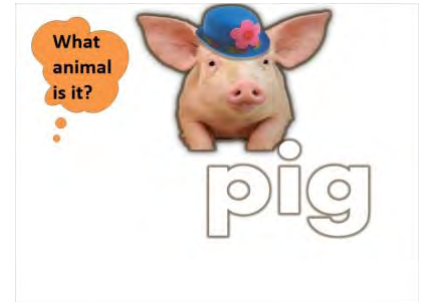
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1.4.9



1.4.10



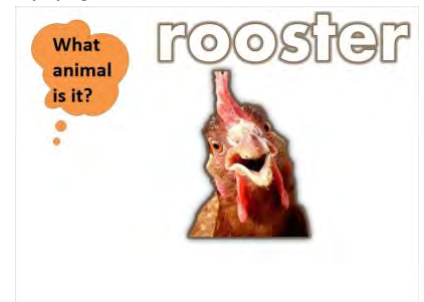
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1.4.12



1.4.13



1.4.14

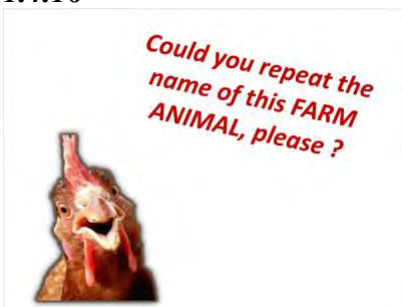




1.4.15



1.4.16



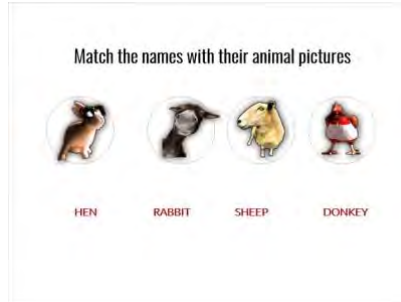
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1.4.18



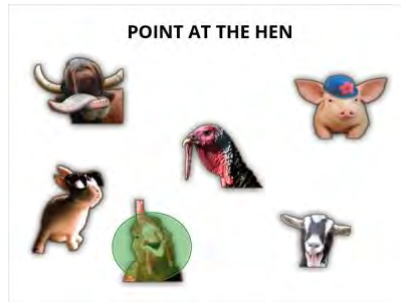
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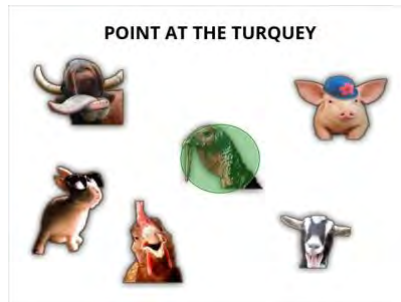
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1.4.21



1.4.22



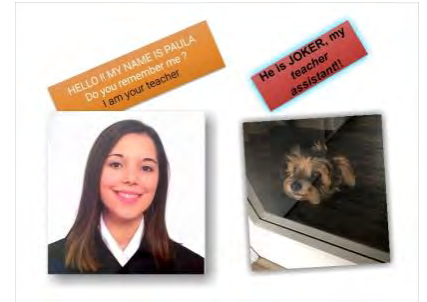
1.4.23



1.4.24



1.4.25



1.4.26



1.4.27



1.4.28



1.4.29



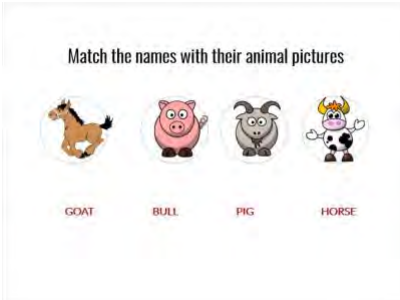
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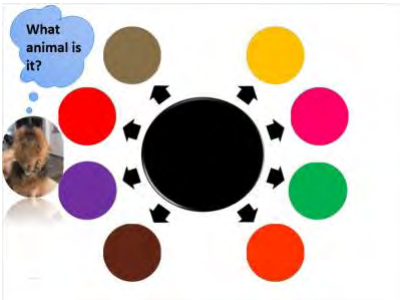
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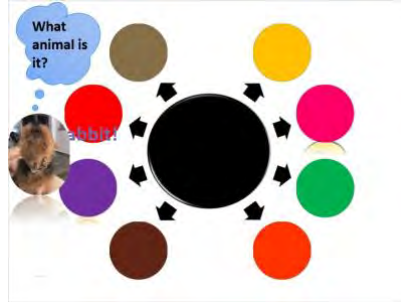
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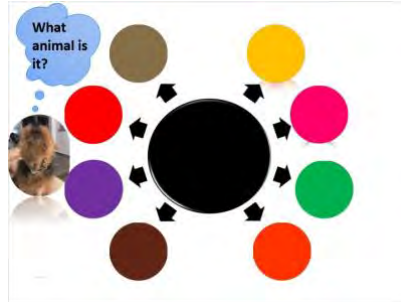
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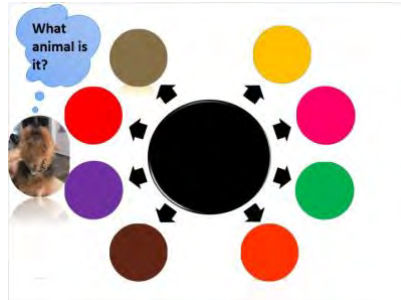
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1.4.35



1.4.36



1.4.37



1.4.38



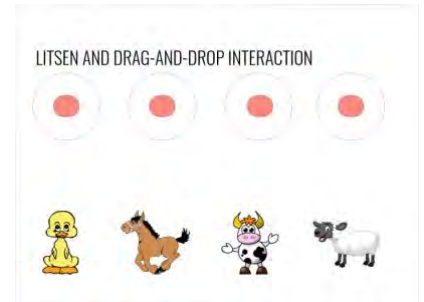
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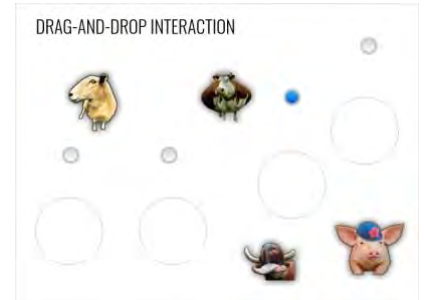
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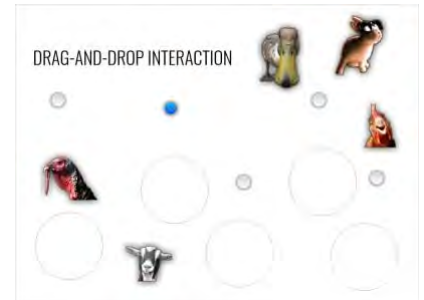
1.4.41



1.4.42



1.4.43



### 1.4.44





## 1.5. Body parts

### “Pets, farm and wild animals”

1.5.1

#### Animal Body Parts



1.5.2



**a tail**

Which animals have tail?

1.5.3



Monkeys have long tails

1.5.4

#### Wings



Has this animal got wings?

1.5.5



All birds have wings

1.5.6

#### Scales



Which animals have got scales?

1.5.7

snakes



fish



Snakes and fish have scales

1.5.8

#### Paws



Which animals have got paws?

1.5.9



Cats and dogs have paws

1.5.10

#### Horns



Which animals have got horns?

1.5.11



Cows and goats have big horns

1.5.12

#### Shell



Which animals have got shell?

1.5.13



Turtles and snails have shells

1.5.14



Feather

Which animals have feathers?

1.5.15



Parrots have colorful feathers

1.5.16



Rabbits have beautiful and white fur

1.5.17

Beak



Which animals have beak?

All birds have beak

1.5.18



Mane



Which animals have got mane?

1.5.19



Horses and lions have mane

1.5.20



Fur

Which animals have fur?

1.5.21

This ANIMAL has got a tail ?



duck

This ANIMAL has got whiskers?

1.5.22

This ANIMAL has got a tail ?



fox

This ANIMAL has got feathers?

1.5.23

This ANIMAL has got a tail ?



eagle

This ANIMAL has got feathers?

1.5.24

This ANIMAL has got a beak?



snake

This ANIMAL has got scales?

1.5.25



Whiskers

Which animals have whiskers?

1.5.26

This ANIMAL has got wings?

penguin



This ANIMAL has got feathers?

1.5.27

This ANIMAL has got fur ?



crocodile

This ANIMAL has got a mane?

1.5.28

WHIC ANIMAL has got WINGS ?



1.5.29

WHIC ANIMAL has got beak ?



### 1.5.30



### 1.5.31





## 1.6. Animal sounds

### “Pets, farm and wild animals”

1.6.1



1.6.2



1.6.3



1.6.4



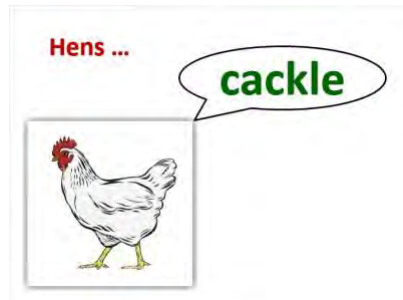
1.6.5



1.6.6



1.6.7



1.6.8



1.6.9



1.6.10



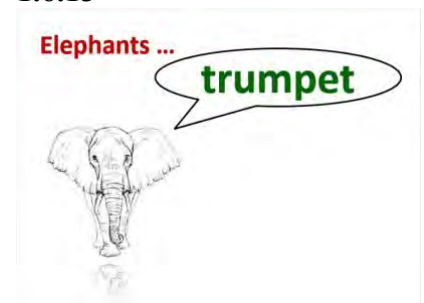
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1.6.12



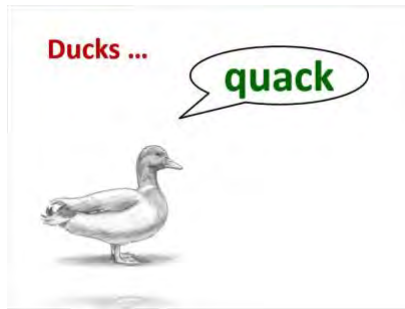
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1.6.14



1.6.15



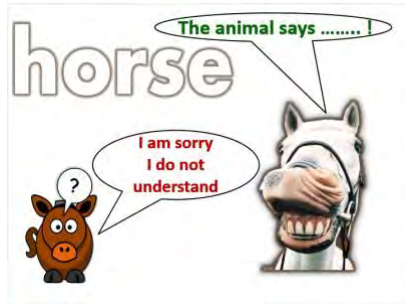
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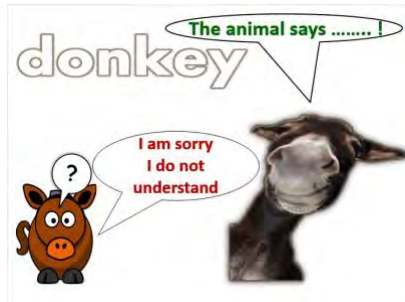
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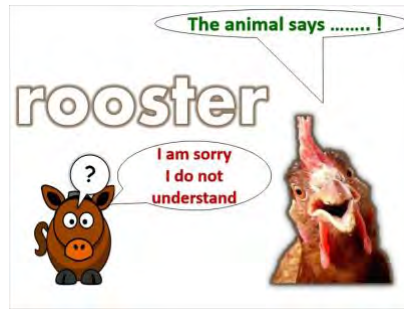
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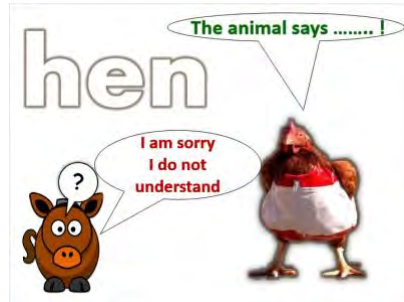
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1.6.20



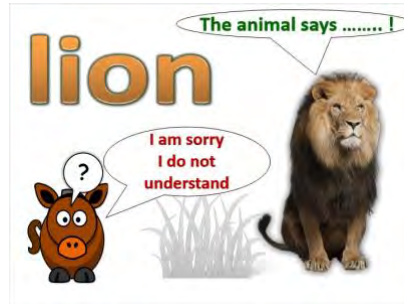
1.6.21



1.6.22



1.6.23



1.6.24



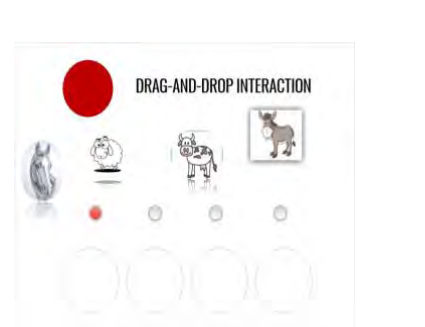
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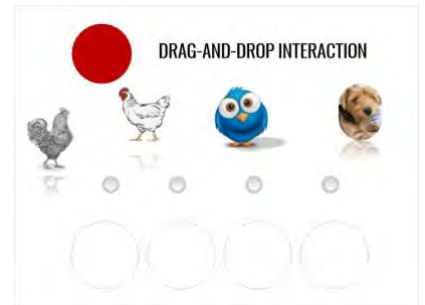
1.6.26



1.6.27



1.6.28



1.6.29







### 1.6.30



## 1.7. Play more

### “Pets, farm and wild animals”

#### 1.7.1

Do you want to play more?



**A** WHAT ANIMALS CAN YOU SEE IN THE FOLLOWING IMAGES?


**B** ANIMALS ALPHABET

**C** FARM ANIMALS GAMES

JOKER

#### 1.7.2

WHAT ANIMALS CAN YOU SEE IN THE FOLLOWING IMAGES?



#### 1.7.3

LOOK FOR 1 ANIMAL



**A BUTTERFLY**

#### 1.7.4

LOOK FOR 1 ANIMAL



**A BIRD**

#### 1.7.5

LOOK FOR 1 ANIMAL



**A TIGER**

#### 1.7.6

LOOK FOR 2 ANIMALS



**BIRDS AND FISH**

#### 1.7.7


LOOK FOR 2 ANIMALS



**BUTTERFLY AND SEAHORSES**

#### 1.7.8

LOOK FOR 2 ANIMALS



**COCODRILES AND EAGLE**

#### 1.7.9


LOOK FOR 2 ANIMALS



**ELEPHANTS AND SNAKE**

#### 1.7.10

**MONKEYS AND SHEEP**



LOOK FOR 2 ANIMALS

#### 1.7.11

LOOK FOR 2 ANIMALS



**PIGS AND BAT**

#### 1.7.12

LOOK FOR 6 ANIMALS



#### 1.7.13

LOOK FOR 6 ANIMALS





1.7.14



1.7.15



1.7.16



1.7.17

<b>A</b> A small insect	<b>B</b> An animal that produces honey	<b>C</b> An animal that lives in the rivers
<b>D</b> An animal similar to horse	<b>E</b> An animal with a long nose	<b>F</b> An animal similar to wolf
<b>G</b> An animal that lives in farms and mountains	<b>H</b> An animal that cowboys ride	<b>I</b> An animal that looks like a dinosaur

NEXT SLIDE

<b>J</b> jaguar	<b>K</b> kangaroo	<b>L</b> ladybird
<b>M</b> monkey	<b>N</b> nightingale	<b>O</b> octopus
<b>P</b> parrot	<b>Q</b> quail	<b>R</b> reindeer

1.7.18

<b>J</b> An animal similar to leopard	<b>K</b> An animal that jumps	<b>L</b> A red and black insect that can fly
<b>M</b> An animal that lives in trees	<b>N</b> A bird that sings beautifully	<b>O</b> An animal with eight arms
<b>P</b> A bird that can talk	<b>Q</b> A bird that looks like a small partridge	<b>R</b> An animal that pulls Santa's sleigh

NEXT SLIDE

<b>s</b> sheep	<b>t</b> tiger	<b>u</b> uakari
<b>v</b> vulture	<b>w</b> whale	<b>x</b> xenarthra
<b>y</b> yak	<b>z</b> zebra	<b>ñ</b> ñu

1.7.19

<b>S</b> An animal that gives us wool	<b>T</b> An animal that lives in the jungle	<b>U</b> An apt with red fur
<b>V</b> A bird that eats dead animals	<b>W</b> A big animal that lives in the sea	<b>X</b> An animal with an armour
<b>Y</b> An animal similar to a bull that lives in the Himalaya	<b>Z</b> An animal similar to a donkey with white and black stripes	<b>Ñ</b> In Spanish, an animal that belongs to the family of antelopes beginning with N

NEXT SLIDE

<b>a</b> ant	<b>b</b> bee	<b>c</b> crocodile
<b>d</b> donkey	<b>e</b> elephant	<b>f</b> fox
<b>g</b> goat	<b>h</b> horse	<b>i</b> iguana

1.7.20

**FARM ANIMAL GAME**

1.7.21



1.7.22



1.7.23

**Order the letters and say the animal**

**HEPES**

1.7.24

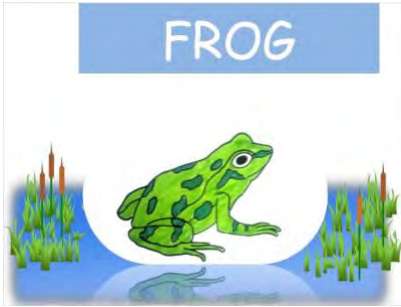
**SHEEP**

1.7.25

**Order the letters and say the animal**

**ROFG**

1.7.26



1.7.27



1.7.28



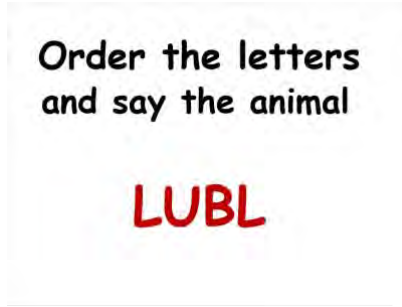
1.7.29



1.7.30



1.7.31



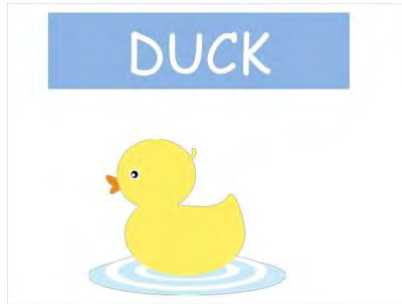
1.7.32 BULL



1.7.33



1.7.34



1.7.35



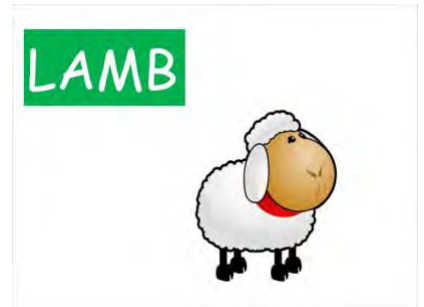
1.7.36



1.7.37



1.7.38



1.7.39



1.7.40





1.7.41

Order the letters  
and say the animal

**IBRD**

1.7.42

**BIRD**



1.7.43

How many foals are there?



1.7.44

**FIVE FOALS**



1.7.45

**Read and  
say the animal:**

- It is a baby animal.
- It is a bird.
- It can swim.
- It is very noisy.

1.7.46

**DUCK**



1.7.47

Order the letters  
and say the animal

**IGP**

1.7.48



1.7.49

Order the letters  
and say the animal

**LFAC**

1.7.49

**CALF**



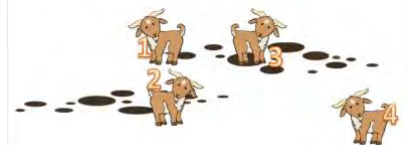
1.7.50

How many kids are there?



1.7.51

**FOUR KIDS**



1.7.52

Order the letters  
and say the animal

**NHE**

1.7.53



1.7.54

**Read and  
say the animal:**

- It is a baby animal.
- It is a mammal.
- It has got long ears.
- It likes carrots.

1.7.55

RABBIT



1.7.56

Order the letters  
and say the animal

LETGIP

1.7.57

PIGLET



1.7.58

How many calves are there?



1.7.59

ONE CALF



1.7.60

Order the letters  
and say the animal

CCHKI

1.7.61

CHICK



1.7.62

How many ducklings are there?



1.7.63

SIX DUCKLINGS



1.7.64

Read and  
say the animal:

- It is a baby animal.
- It is an amphibian.
- It can sing, jump and hop.
- It has got big eyes.

1.7.65

FROG



1.7.66

How many bunnies are there?



1.7.67

THREE BUNNIES



1.7.68

How many birds are there?



1.7.69

TWO BIRDS





1.7.70

Order the letters  
and say the animal

WOC

1.7.71

COW



1.7.72

Order the letters  
and say the animal

ROHES

1.7.73

HORSE



1.7.74

How many frogs are there?



1.7.75

TEN FROGS



1.7.76



DRAG-AND-DROP INTERACTION



1.7.77



DRAG-AND-DROP INTERACTION



1.7.78

RESULTS LAYOUT

%Results.ScorePercent%% %Results.PassPercent%%  
Your Score: Passing Score:

Review Print Retry

## APPENDIX II

ENGLISH RESOURCES	
NAME	ELECTRONIC ADDRESS
1. La Mansión del Inglés. On this website there is theoretical information, exercises, e-books, videos, games and other activities to practice grammar and spelling, train the ear and learn vocabulary.	<a href="http://www.mansioningles.com">http://www.mansioningles.com</a>
2. engVid. Repository with more than 850 free video lessons that address different topics of all levels. They can be used to apply the flipped classroom in class or to review certain aspects of grammar, vocabulary or pronunciation with your students.	<a href="https://www.engvid.com">https://www.engvid.com</a>
3. Language Guide. Collaborative project to develop interactive learning resources with integrated audio in several languages. It allows to practice vocabulary, grammar, pronunciation and oral and written comprehension.	<a href="http://www.languageguide.org/english/">http://www.languageguide.org/english/</a>
4. Oxford Learners Dictionary. The traditional Oxford dictionary, now online and with add-ons, such as word lists by topic or notifications of new English language words, such as photobomb.	<a href="https://www.oxfordlearnersdictionaries.com">https://www.oxfordlearnersdictionaries.com</a>
5. Wordreference. The multilingual dictionary includes multiple uses and meanings of words, audio and forums to share doubts and discuss the meaning and translation of words.	<a href="https://www.wordreference.com/es/">https://www.wordreference.com/es/</a>
6. Urban dictionary. To consult the terms and meanings that do not appear in traditional dictionaries: new terms, slang, fashion expressions, sayings, etc. All those words that give color to the language.	<a href="https://www.urbandictionary.com">https://www.urbandictionary.com</a>
7. Merriam-Webster. Visual dictionary that helps to learn and memorize the English names of many objects and elements illustrated and classified by theme.	<a href="http://www.visualdictionaryonline.com/index.php">http://www.visualdictionaryonline.com/index.php</a>
8. Vocabulario Learning Chocolate. Platform for learning English vocabulary that includes a multitude of terms photographed and classified by themes, audios and activities to memorize.	<a href="http://www.learningchocolate.com">http://www.learningchocolate.com</a>
9. Phrasal Verb Demon. Practical guide of phrasal verbs to work and help your students to know and memorize these key expressions for English proficiency.	<a href="https://www.phrasalverbdemon.com">https://www.phrasalverbdemon.com</a>
10. verb2verb. Verb conjugator that shows in a single click all the verb forms you wish to consult.	<a href="http://www.verb2verbe.com/default.aspx">http://www.verb2verbe.com/default.aspx</a>
11. Spell Up. Interactive online game for the Chrome browser that improves vocabulary, pronunciation, comprehension and spelling. The user must spell, pronounce, complete or write words to form an increasingly high tower and level up. As levels progress the difficulty is increasing.	<a href="https://chrome.google.com/webstore/detail/spell-up/ecehlppeiiphgjhcnlaobaamdemkgaado?hl=es">https://chrome.google.com/webstore/detail/spell-up/ecehlppeiiphgjhcnlaobaamdemkgaado?hl=es</a>
12. Listen and write. Website that brings the dictates to the present and allows students to work on understanding and writing English while transcribing from Coldplay or Katy Perry songs, to Emily Dickinson's poems, TED conferences or news.	<a href="https://www.listen-and-write.com">https://www.listen-and-write.com</a>
13. Write Source. Site designed to encourage writing in children aged 6 to 18 years. It offers a good list of topics to propose writing in class, as well as examples for each one.	<a href="http://www.thewritesource.com/writing_topics/#inc">http://www.thewritesource.com/writing_topics/#inc</a>
14. Pen Pal World.	<a href="http://www.penpalworld.com">http://www.penpalworld.com</a>



<p>Portal for people interested in maintaining correspondence with people from other countries. It is ideal for you to encourage your students to reinforce their written expression, while meeting people from other countries and cultures.</p>	
<p>15. Starfall. Minisite that allows Primary students to access nonfiction stories or texts in which, while reading and listening, they practice the use of verbs or expressions. There are also simple games with which to practice English vocabulary.</p>	<p><a href="https://www.starfall.com/h/">https://www.starfall.com/h/</a></p>
<p>16. National Geographic Kids. Web of the National Geographic magazine aimed at children, where you will find numerous readings about the natural world, as well as other resources, such as videos or games.</p>	<p><a href="https://kids.nationalgeographic.com">https://kids.nationalgeographic.com</a></p>
<p>17. Project Gutenberg. Virtual library that allows you to access and download a multitude of works in English and other royalty-free languages.</p>	<p><a href="https://archive.org/details/gutenberg">https://archive.org/details/gutenberg</a></p>
<p>18. Go comics. Website that collects daily all comic strips published in American magazines and newspapers.</p>	<p><a href="https://www.gocomics.com">https://www.gocomics.com</a></p>
<p>19. Vaughan Radio. This well-known English station, specially designed for Spanish speakers, allows you to train your ear, deepen grammar, expand vocabulary and improve pronunciation with its varied and fun programs for all levels.</p>	<p><a href="http://vaughanradio.com/reproductor">http://vaughanradio.com/reproductor</a></p>
<p>20. Listen a minute. In this web practice, a multitude of one-minute audios organized by themes are proposed. They are accompanied with the corresponding text and exercises to verify that the listening has been understood.</p>	<p><a href="https://listenaminute.com">https://listenaminute.com</a></p>
<p>21. LyricsTraining. Web with a multitude of music videos to improve oral comprehension and writing through song lyrics. The video and level (beginner, intermediate, advanced and expert) are chosen and the gaps must be filled in with the missing words.</p>	<p><a href="https://es.lyricstraining.com/app?nr=1&amp;~channel=web&amp;~feature=redirect&amp;~campaign=none&amp;ref=https%3A%2F%2Fes.lyricstraining.com%2">https://es.lyricstraining.com/app?nr=1&amp;~channel=web&amp;~feature=redirect&amp;~campaign=none&amp;ref=https%3A%2F%2Fes.lyricstraining.com%2</a></p>
<p>22. RD Lessons. Funny English lessons suitable for high school students. They propose exercises and questions from short videos, current news or movies, such as the Happy song by Pharrell Williams, the trailer of Mr. Peabody &amp; Sherman or an interview with the adventurer Kilian Jornet.</p>	<p><a href="https://rdlessons.teachable.com">https://rdlessons.teachable.com</a></p>
<p>23. Storynory. Web with hundreds of stories, fables, poems and songs for children recreated by actors and collected in audios to play online or download. It includes from Greek myths to classics such as The Snow Queen <a href="http://www.storynory.com/2007/12/23/the-snow-queen-part-1/">http://www.storynory.com/2007/12/23/the-snow-queen-part-1/</a>, by Hans Christian Andersen, or Beauty and the Beast <a href="http://www.storynory.com/2008/04/28/beauty-and-the-beast-2/">http://www.storynory.com/2008/04/28/beauty-and-the-beast-2/</a>, by Charles Perrault.</p>	<p><a href="https://www.storynory.com">https://www.storynory.com</a></p>
<p>24. The Speech accent archive. Web to show your students how to pronounce English in every part of the world, non-English speaking regions included.</p>	<p><a href="http://accent.gmu.edu">http://accent.gmu.edu</a></p>
<p>25. Voices in the dark. Page that collects audiobooks of stories, stories, essays and poems.</p>	<p><a href="http://voicesinthedark.com/content.php?iContent=50">http://voicesinthedark.com/content.php?iContent=50</a></p>
<p>26. Podcast in English. Interesting podcast repository to work on oral comprehension accompanied by transcription, questions and activities.</p>	<p><a href="https://www.podcastsinenglish.com">https://www.podcastsinenglish.com</a></p>

27. Aprende Inglés Sila. Web with a large section for the pronunciation of English.	<a href="http://www.aprendeinglessila.com/category/pronunciacion/">http://www.aprendeinglessila.com/category/pronunciacion/</a>
28. Subinglés. Portal with videos of subtitled songs to practice English as a karaoke.	<a href="http://www.subingles.com">http://www.subingles.com</a>
29. Phonetics Focus. Twenty games to work with your students phonetics in a fun way.	<a href="http://cambridgeenglishonline.com/Phonetics_Focus/">http://cambridgeenglishonline.com/Phonetics_Focus/</a>
30. Duolingo. Website and downloadable application for iOS, Android and Windows Phone. It allows learning English, including speaking, interactively, through activities of various types and themes: the user chooses the pace of study, performs a level test and progresses step by step.	<a href="https://es.duolingo.com">https://es.duolingo.com</a>
31. LearnEnglish Teens. Web of the British Council in which innumerable resources are destined so that the students of Secondary and Baccalaureate learn English with activities, videos, images and resources linked to their interests. For Primary students there is the LearnEnglish Kids option.	<a href="http://learnenglishteens.britishcouncil.org">http://learnenglishteens.britishcouncil.org</a> <a href="https://learnenglishkids.britishcouncil.org">https://learnenglishkids.britishcouncil.org</a>
32. Bitesize. BBC website with all kinds of activities, videos and interactive for Primary and Secondary students and different subjects.	<a href="https://www.bbc.com/bitesize">https://www.bbc.com/bitesize</a>
33. ESL Games Plus. Website with interactive proposals, games and activities organized by levels and themes, to practice vocabulary, pronunciation, grammar, etc.	<a href="http://www.eslgamesplus.com">http://www.eslgamesplus.com</a> <a href="https://www.abcy.com/grades/prek">https://www.abcy.com/grades/prek</a>
34. Fun English Games. Page with games, videos, printable activities, lessons by topic and other fun proposals to practice reading, spelling, grammar and written expression.	<a href="http://www.funenglishgames.com">http://www.funenglishgames.com</a>
35. Groove to English. Games and hobbies to review various aspects of Secondary English: vocabulary, reading comprehension, use of verbs, written correction, etc.	<a href="http://www.groovetoenglish.com">http://www.groovetoenglish.com</a>
36. Toy Theater   Educational Games for Kids. Classic games not specific to learn the English language.	<a href="https://toytheater.com">https://toytheater.com</a>
37. JUMPSTART: English Activities for Kids. From the letters of the alphabet and spelling to synonyms and parts of speech, these activities cover everything.	<a href="http://www.jumpstart.com/parents/activities/english-activities">http://www.jumpstart.com/parents/activities/english-activities</a>
38. Sight Words. The instruction of sight words is an excellent complement to the instruction of phonetics. Phonetics is a method of learning to read in general, while frequent-use word instruction increases a child's familiarity with the frequently used words that you will find most frequently.	<a href="https://sightwords.com">https://sightwords.com</a>
39. Geeks With Juniors: Best Apps for Three Year Olds. In mid-2012, a father of two young children connected to the Internet for reviews on the latest educational applications for children and was soon disappointed by its quality. Many of the reviews lacked the essential information I wanted to know, for example, if the application contained purchases within the application or not. Finding a good application through reviews was like trying to find a needle in a haystack. Believing that many parents should share their frustration, he set out to do something about the problem. So he partnered with his writer friend, and the two began writing their own reviews. Thus was born Geeks With Juniors.	<a href="https://www.geekswithjuniors.com/best-apps-for-3-year-olds">https://www.geekswithjuniors.com/best-apps-for-3-year-olds</a>
40. Cookie. Website with English learning resources for children.	<a href="http://www.cookie.com">http://www.cookie.com</a>

Learning games for children help develop the skills necessary to succeed in school. While playing our fun educational games, children learn to read with phonemes, develop skills in math, language, social studies, science and much more. Our educational videos encourage children to continue learning, even after school.	
41. Hello-World. World Languages for Children. More than 800 games and activities in English for free.	<a href="http://www.hello-world.com/languages.php?language=English">http://www.hello-world.com/languages.php?language=English</a>
42. English in Early Childhood: Language Learning and Development.	<a href="https://www.futurelearn.com/courses/english-in-early-childhood">https://www.futurelearn.com/courses/english-in-early-childhood</a>
43. Teach children languages with mobile apps.	<a href="https://www.teachkidslanguages.com">https://www.teachkidslanguages.com</a>
44. Fun English Games for Kids - Free Teaching Resources Online.	<a href="http://www.funenglishgames.com">http://www.funenglishgames.com</a>
45. Lesson materials by engoo.	<a href="https://engoo.com/app/materials/en">https://engoo.com/app/materials/en</a>
46. Learning and teaching resources. This section contains both online and printable activities that introduce young learners to basic English vocabulary grouped into 36 thematic topics, reflecting kids' interests.	<a href="https://www.anglomaniacy.pl">https://www.anglomaniacy.pl</a>
47. Games for learning English and vocabulary, games and activities and grammar games and activities. ESL Games Plus offers interactive online games to learn and teach English as a second language. Our learning games are mostly suitable for teaching ESL children and teenagers. There are activities to teach and practice English grammar, vocabulary, sentences, listening comprehension and pronunciation. By playing our fun educational games, students learn English vocabulary, sentence structures, grammar, listening, pronunciation and phonetics. The site presents these ESL activities online: ESL classroom games, memory games, spelling games, prayer games, interactive board games, Hangman games, Jeopardy, Wheel Games, Concentration Games, Matching Games, Car Racing Games, Pirate Games, Crocodile Games, Word Recognition Games, Mobile Games for iPad, iPhones and Android devices.	<a href="https://www.eslgamesplus.com">https://www.eslgamesplus.com</a>
48. English Kids TV videos to learn English.	<a href="https://multimedia-english.com/videos/performer/english-kids-tv">https://multimedia-english.com/videos/performer/english-kids-tv</a>
49. Muzzy BBC.	<a href="https://www.muzzybbc.com/learn-english-kids">https://www.muzzybbc.com/learn-english-kids</a>
50. Association publisher staff distributors chess and English.	<a href="https://www.chessandenglish.com">https://www.chessandenglish.com</a>
51. EnglishClub — The world's premier free website for learners and teachers of English.	<a href="https://www.englishclub.com/kids/stories/">https://www.englishclub.com/kids/stories/</a>
52. STUDYCAT. Fun English - Language Learning Games for Kids.	<a href="https://studycat.com/apps/fun-english/">https://studycat.com/apps/fun-english/</a>
53. Start Reading for Children.	<a href="https://www.eslfast.com/kidsenglish/index.htm">https://www.eslfast.com/kidsenglish/index.htm</a>
54. Esibase. Free resources and advice for teaching English, whether you are just starting out, an experienced teacher or an intermediate place.	<a href="https://www.esibase.com">https://www.esibase.com</a>
55. LEARN ENGLISH FOR KIDS.	<a href="https://1efclubs.co.nz/learn-english/">https://1efclubs.co.nz/learn-english/</a>
56. ESL Kids Lesson plans, flashcards, worksheets, songs, readers, crafts & apps.	<a href="https://www.eslkidstuff.com">https://www.eslkidstuff.com</a>
57. BBC.	<a href="http://www.bbc.co.uk/learning/subjects/science.shtml">http://www.bbc.co.uk/learning/subjects/science.shtml</a>

<p>58. Lingokids - English For Kids 4+ Educational language learning.</p>	<p><a href="https://apps.apple.com/us/app/lingokids-english-for-kids/id1002043426">https://apps.apple.com/us/app/lingokids-english-for-kids/id1002043426</a></p>
<p>59. English Learning Activities.</p>	<p><a href="https://www.kidsworldfun.com/learn-english/">https://www.kidsworldfun.com/learn-english/</a></p>
<p>60. DINOLINGO.</p> <p>English lessons for kids English learning games English children's books, stories English flashcards, worksheets English songs for kids</p>	<p><a href="https://dinolingo.com/learn-english-for-kids/">https://dinolingo.com/learn-english-for-kids/</a></p>
<p>61. The 13 Best Cartoons for Learning English.</p> <ol style="list-style-type: none"> <li>1. "Martha Speaks"</li> <li>2. "Word Girl"</li> <li>3. "Doki"</li> <li>4. "Postcards From Buster"</li> <li>5. "Adventure Time"</li> <li>6. "Regular Show"</li> <li>7. Cartoon Clips on FluentU</li> <li>8. "Dexter's Laboratory"</li> <li>9. "Phineas and Ferb"</li> <li>10. "Inspector Gadget"</li> <li>11. "Teen Titans" or "Young Justice" (and Other Superhero Shows)</li> <li>12. "Avatar: The Last Airbender"</li> <li>13. "The Wild Thornberrys"</li> </ol>	<p><a href="https://pbskids.org/martha/">https://pbskids.org/martha/</a>  <a href="https://pbskids.org/wordgirl/adventures/">https://pbskids.org/wordgirl/adventures/</a>  <a href="https://www.amazon.com/gp/video/detail/B00080XCJU/ref=atv_dl_rdr?creativeASIN=B00080XCJU&amp;linkCode=w61&amp;imprToken=0LE2LqJymJ3-uoSmT8es1Q&amp;slotNum=0">https://www.amazon.com/gp/video/detail/B00080XCJU/ref=atv_dl_rdr?creativeASIN=B00080XCJU&amp;linkCode=w61&amp;imprToken=0LE2LqJymJ3-uoSmT8es1Q&amp;slotNum=0</a> (paying)  <a href="https://pbskids.org/buster/videos/">https://pbskids.org/buster/videos/</a>  <a href="https://www.cartoonnetwork.es">https://www.cartoonnetwork.es</a>  <a href="https://www.cartoonnetwork.es">https://www.cartoonnetwork.es</a>  <a href="https://www.fluentu.com/english/">https://www.fluentu.com/english/</a>  <a href="https://www.cartoonnetwork.es">https://www.cartoonnetwork.es</a>  <a href="https://www.amazon.com/gp/video/detail/B006GM4LKQ/ref=atv_dp_season_select_atf?creativeASIN=B006GM4LKQ&amp;linkCode=w61&amp;imprToken=0LE2LqJymJ3-uoSmT8es1Q&amp;slotNum=1">https://www.amazon.com/gp/video/detail/B006GM4LKQ/ref=atv_dp_season_select_atf?creativeASIN=B006GM4LKQ&amp;linkCode=w61&amp;imprToken=0LE2LqJymJ3-uoSmT8es1Q&amp;slotNum=1</a>  <a href="https://www.netflix.com/es/title/80025273">https://www.netflix.com/es/title/80025273</a>  <a href="https://www.netflix.com/es/title/70185194">https://www.netflix.com/es/title/70185194</a>  <a href="http://www.nickelodeon.es">http://www.nickelodeon.es</a>  <a href="https://www.amazon.com/gp/video/detail/B01737TSHS/ref=atv_dp_season_select_atf?creativeASIN=B01737TSHS&amp;linkCode=w61&amp;imprToken=0LE2LqJymJ3-uoSmT8es1Q&amp;slotNum=3">https://www.amazon.com/gp/video/detail/B01737TSHS/ref=atv_dp_season_select_atf?creativeASIN=B01737TSHS&amp;linkCode=w61&amp;imprToken=0LE2LqJymJ3-uoSmT8es1Q&amp;slotNum=3</a></p>
<p>62. OXFORDHOUSE.</p> <p>The Best Websites to Help Your Kids Learn English English Learning Websites for Children Aged 3-5 Years Old</p> <ol style="list-style-type: none"> <li>1 Super Simple Songs</li> <li>2. Put On Your Shoes   Clothing Song for Kids</li> <li>3. The Pinocchio   Nursery Rhymes   Super Simple Songs</li> <li>4. The Singing Walrus</li> <li>5. The Action Song</li> <li>6. Nick Jr</li> <li>7. CBeebies</li> </ol>	<p><a href="https://oxfordhousebcn.com/en/best-websites-to-help-your-kids-learn-english-at-home/">https://oxfordhousebcn.com/en/best-websites-to-help-your-kids-learn-english-at-home/</a>  <a href="https://www.youtube.com/channel/UCLoMlIoIpI_7ux2jvdPB-Q">https://www.youtube.com/channel/UCLoMlIoIpI_7ux2jvdPB-Q</a>  <a href="https://www.youtube.com/watch?v=-jBfb33_KHU">https://www.youtube.com/watch?v=-jBfb33_KHU</a>  <a href="https://www.youtube.com/watch?v=IV-D_K4drsA">https://www.youtube.com/watch?v=IV-D_K4drsA</a>  <a href="https://www.youtube.com/user/SingingWalrusMusic">https://www.youtube.com/user/SingingWalrusMusic</a></p>

<p>English Learning Websites for Children Aged 6-8 Years Old</p> <ol style="list-style-type: none"> <li>1. BRITISH COUNCIL</li> <li>2. NICKELODEON</li> <li>3. ESL</li> <li>4. BBC BITESIZE</li> </ol> <p>English Learning Websites for Children Aged 9-11 Years Old</p> <ol style="list-style-type: none"> <li>1. CN</li> <li>2. AKINATOR</li> <li>3. CAMBRIDGE</li> </ol>	<p><a href="https://www.youtube.com/watch?v=dUXk8Nc5qQ8">https://www.youtube.com/watch?v=dUXk8Nc5qQ8</a></p> <p><a href="http://www.nickjr.co.uk">http://www.nickjr.co.uk</a></p> <p><a href="https://global.cbeebies.com">https://global.cbeebies.com</a></p> <p><a href="https://learnenglishkids.britishcouncil.org">https://learnenglishkids.britishcouncil.org</a></p> <p><a href="http://www.nick.co.uk">http://www.nick.co.uk</a></p> <p><a href="https://learnenglishkids.britishcouncil.org">https://learnenglishkids.britishcouncil.org</a></p> <p><a href="https://www.eslgamesplus.com">https://www.eslgamesplus.com</a></p> <p><a href="https://www.bbc.co.uk/bitesize/subjects/zgkw2hv">https://www.bbc.co.uk/bitesize/subjects/zgkw2hv</a></p> <p><a href="http://www.cartoonnetwork.co.uk">http://www.cartoonnetwork.co.uk</a></p> <p><a href="https://en.akinator.com">https://en.akinator.com</a></p> <p><a href="https://www.cambridgeenglish.org/learning-english/index.htm">https://www.cambridgeenglish.org/learning-english/index.htm</a></p> <p><a href="https://www.cambridgeenglish.org/learning-english/parents-and-children/activities-for-children/">https://www.cambridgeenglish.org/learning-english/parents-and-children/activities-for-children/</a></p>
<p>63. EFL ACTIVITIES FOR KIDS.</p>	<p><a href="http://www.english-4kids.com/index.html">http://www.english-4kids.com/index.html</a></p>
<p>64. GOOGLE PLAY. Learn English for Kids</p>	<p><a href="https://play.google.com/store/apps/details?id=com.talkenglish.kids&amp;hl=en_US">https://play.google.com/store/apps/details?id=com.talkenglish.kids&amp;hl=en_US</a></p>
<p>65. FREDISALEARNS.</p>	<p><a href="https://www.fredisalearns.com">https://www.fredisalearns.com</a></p>
<p>66. The 10 Best ESL Websites for Kids to Learn English at Home and School.</p>	<p><a href="https://www.fluentu.com/blog/educator-english/esl-websites-for-kids/">https://www.fluentu.com/blog/educator-english/esl-websites-for-kids/</a></p>
<p>67. The Best Websites to Help Your Kids Learn English.</p>	<p><a href="https://oxfordhousebcn.com/en/best-websites-to-help-your-kids-learn-english-at-home/">https://oxfordhousebcn.com/en/best-websites-to-help-your-kids-learn-english-at-home/</a></p>
<p>68. KIDSSCHOOL-AGE. 9 best educational websites for kids</p>	<p><a href="https://www.todayparent.com/family/best-educational-websites-for-kids-that-are-actually-fun/">https://www.todayparent.com/family/best-educational-websites-for-kids-that-are-actually-fun/</a></p>
<p>69. Terrific Online Games for English Language Learners.</p>	<p><a href="https://www.onlinecollegecourses.com/2012/08/27/25-terrific-online-games-for-english-language-learners/">https://www.onlinecollegecourses.com/2012/08/27/25-terrific-online-games-for-english-language-learners/</a></p>
<p>70. The 50 Best ESL Resources for Kids.</p>	<p><a href="http://www.studentguide.org/the-50-best-esl-resources-for-kids/">http://www.studentguide.org/the-50-best-esl-resources-for-kids/</a></p>
<p>71. 11 Free Websites to Practice English at Home.</p>	<p><a href="https://www.nyp1.org/blog/2012/11/28/11-great-free-websites-practice-english">https://www.nyp1.org/blog/2012/11/28/11-great-free-websites-practice-english</a></p>
<p>72. Elementary Web Sites for English Language Learners.</p>	<p><a href="http://www.everythingsl.net/in-services/elementary_sites_ells_71638.php">http://www.everythingsl.net/in-services/elementary_sites_ells_71638.php</a></p>
<p>73. At Starfall, children have fun while they learn.</p>	<p><a href="https://www.starfall.com/h/">https://www.starfall.com/h/</a></p>
<p>74. Learning Games For Kids.</p>	<p><a href="https://www.learninggamesforkids.com/">https://www.learninggamesforkids.com/</a></p>
<p>75. ABC Education brings you free educational resources for Primary and Secondary students – thousands of videos, games and programs.</p>	<p><a href="http://education.abc.net.au/home#!/home">http://education.abc.net.au/home#!/home</a></p>

76. 11 Free Reading Websites for Kids.	<a href="https://blog.reallygoodstuff.com/11-free-reading-websites-for-kids/">https://blog.reallygoodstuff.com/11-free-reading-websites-for-kids/</a>
77. ZooBorns.	<a href="https://www.zooborns.com">https://www.zooborns.com</a>
78. Walking With Dinosaurs.	<a href="https://www.bbcearth.com/walking-with-dinosaurs">https://www.bbcearth.com/walking-with-dinosaurs</a>
79. World Wildlife Fund.	<a href="https://www.worldwildlife.org">https://www.worldwildlife.org</a>
80. PETA Kids: Help Animals With Fun Games, Get Animal Facts.	<a href="https://www.petakids.com">https://www.petakids.com</a>
81. Animal Games   PBS KIDS.	<a href="https://pbskids.org/games/animal/">https://pbskids.org/games/animal/</a>

## SCIENCE RESOURCES

NAME	ELECTRONIC ADDRESS
<p>1. Edheads.</p> <p>Considered as one of the best science websites for interactive learning for children. It has a large collection of interactive science-related activities that will keep children entertained and at the same time expand their little minds.</p> <p>Activities include things like creating a stem cell line, designing a cell phone, investigating an accident site and even performing brain surgery (less blood, of course). They can also play with some basic machines and investigate the weather.</p>	<a href="https://edheads.org/">https://edheads.org/</a>
<p>2. Curiosity.</p> <p>Machine helps children build, share and receive comments from experts. Its main focus is to teach children and their parents about the power of Artificial Intelligence. Its main focus is to gather family members to learn and build their own AI.</p> <p>It has a specific "Family Challenge" which is a "free and practical artificial intelligence educational program that brings together families, schools, communities and technological knowledge to give everyone the opportunity to learn, play and create with AI."</p>	<a href="https://www.curiositymachine.org">https://www.curiositymachine.org</a>
<p>3. Teachers TryScience.</p> <p>Website designed specifically to arouse the interest of any young mind in science, technology, engineering and mathematics. In essence, its goal is to bring design-based learning to children at home or at school.</p> <p>According to their own website, it helps children "solve a problem in environmental sciences, students may need to use concepts and skills in physics, chemistry and earth sciences."</p> <p>To this end, it has a large collection of interactive experiments, field trips and other adventures. It also includes lesson plans, strategies and tutorials for teachers to help them better deliver impressive science lessons for their always curious students.</p>	<a href="http://www.teacherstryscience.org">http://www.teacherstryscience.org</a>
<p>4. Exploratorium.</p> <p>This site offers practical experiences that will help teach children about basic and more complex scientific principles.</p> <p>It covers topics from many science disciplines, from biology and earth sciences to astronomy. The site also has a section for parents and teachers that will provide free resources to help you plan and incorporate your interactive material to boost your child's learning.</p>	<a href="https://www.exploratorium.edu">https://www.exploratorium.edu</a>
<p>5. Science Kids.</p> <p>Interactive learning website that focuses on teaching children the wonders of science. The site has a wide variety of interactive science games that cover topics from living things to physical processes and everything else.</p> <p>The best thing about the content of this site is that it not only educates young minds but also helps them put that knowledge into practice to consolidate it in their memory. A particularly useful game will make your child design and build a virtual electrical circuit.</p>	<a href="http://www.sciencekids.co.nz/gamesactivities.html">http://www.sciencekids.co.nz/gamesactivities.html</a>



<p>Each subject comes in modules that are then subdivided into subcategories. Living beings, by way of example, are divided into food chains, microbes and the human body, etc.</p>	
<p>6. BrainPOP. A great site for interactive science learning and is very well designed to boot. It is a very active site for young students with a lot of animations, films and short interactive quizzes. It covers topics such as cell life and genetics, ecology and behavior, the forces of nature, our fragile environment, scientific research and paleontology and anthropology. Therefore, a young aspiring scientist will surely find something that will spark his interest. It also has some interactive coding lessons that are always fantastic ways to learn something that you are not normally exposed to. The site will make them hack government websites in no time, just jokes, of course.</p>	<p><a href="https://www.brainpop.com">https://www.brainpop.com</a></p>
<p>7. HHMI. The website is full of excellent interactive 3-D labs, and printable activities for use. Its material is attractive and interesting for science fans of all ages. These guys are famous for their award-winning virtual labs and high quality informational videos so you know you're in good hands. Their site includes "Click and Learn" activities that include embedded video clips and animations, all of which have stop points and evaluations to help verify that you have been paying attention.</p>	<p><a href="https://www.biointeractive.org">https://www.biointeractive.org</a></p>
<p>8. Annenberg Learner Interactive. Topics related to Earth Sciences full of great and easy to understand graphics and other interactive content. It has a good collection of interactive lessons that cover important things like the structure of the Earth for plate tectonics. The site also covers many other subjects with Earth Sciences of Rock Cycle and Volcanoes that really make this matter come alive for any young student. It also has other resources for other scientific subjects with interactive games and other lessons.</p>	<p><a href="https://www.learner.org/interactives/dynamicearth/structure/">https://www.learner.org/interactives/dynamicearth/structure/</a></p>
<p>9. National Geographic Kids. The Web is divided into useful subcategories to facilitate the navigation of your child's learning. Each section contains extensive and informative reports on different animals, from lions to whales, with the support of world-class National Geographic images. Each section also includes memory games, quizzes and other different activities to reinforce your learning by applying your new knowledge found.</p>	<p><a href="https://www.natgeokids.com/uk/">https://www.natgeokids.com/uk/</a></p>
<p>10. PhET Interactive Simulations. An interactive and fun website related to science. Built and managed by the University of Boulder, Colorado, it has a vast collection of simulators that cover most topics with physics, from circuits to waves and quantum mechanics. However, keep in mind that you can find yourself playing aimlessly with variables without realizing that hours of your previous time have passed. No, we repeat, no, try spring simulation, it's too much fun. It also has some materials that cover Earth Sciences, chemistry and life sciences, but these are much less extensive.</p>	<p><a href="https://phet.colorado.edu/en/simulations/category/new">https://phet.colorado.edu/en/simulations/category/new</a></p>
<p>Wonderville. A science related website that is full of interactive activities for children. According to the Wonderville website, "it makes learning science fun for children. We help teachers teach and students learn. Used in 170 countries, our award-winning STEM content helps create lifelong learners." In addition to fun and entertaining games, it also has a very good blog for the most curious children who want to delve into a topic.</p>	<p><a href="https://wonderville.org">https://wonderville.org</a></p>
<p>11. Sciencecases.</p>	<p><a href="http://sciencecases.lib.buffalo.edu/cs/">http://sciencecases.lib.buffalo.edu/cs/</a></p>

Perfect for middle school to college, this website hosts case studies, click questions, puzzle activities, labs and demonstrations. They can be easily searched and are ready to help their students solve real-world problems.	
12. NGSS. Site to attract students using natural curiosity to guide the way.	<a href="https://www.ngssphenomena.com">https://www.ngssphenomena.com</a>
13. Data Nuggets. They are free activities in the classroom, designed jointly by scientists and teachers, designed to bring contemporary research and authentic data to the classroom. The Data Nuggets include a connection with the scientist behind the data and the real history of his research. Each activity gives practical students working with "messy data" and interpreting quantitative information. Students are guided through the entire science process, including the identification of hypotheses and predictions, the visualization and interpretation of data, the making of evidence-based statements and the realization of their own questions for future research. Because of its simplicity and flexibility, Data Nuggets can be used throughout the school year and in grades K-16, as students grow in their quantitative skills and gain confidence. " It seems to me real science!	<a href="http://datanuggets.org">http://datanuggets.org</a>
14. Bozeman Science. Clear videos aligned with the standards, they saved me during my first year teaching AP Chemistry. They allowed me, like many others, to change my classroom and provide additional support for students with difficulties.	<a href="http://www.bozemanscience.com">http://www.bozemanscience.com</a>
15. Njctl.org. Each science subject is divided into main themes and resources are carefully classified and numerous.	<a href="https://njctl.org/courses/science/">https://njctl.org/courses/science/</a>
16. HHMI His films are not only available for streaming from the site, but also have interactive 3-D, virtual labs and printable activities for use.	<a href="https://www.biointeractive.org">https://www.biointeractive.org</a>
17. Biologyjunction. If you need a template for lab reports, ideas for your biology club, rhythm guides or biology lessons, pre-AP biology or AP biology, this is the place to start.	<a href="https://www.biologyjunction.com">https://www.biologyjunction.com</a>
18. Biology Corner. The design is visual and Pinterest-style, and the content is novel and includes selected resources from around the web along with additional practices and presentations, as well as ready-to-use research.	<a href="https://www.biologycorner.com">https://www.biologycorner.com</a>
19. Universidad de Stanford. It uses sea urchins as an attractive entry point for life science concepts ranging from basic biology (introductory microscopy and predator-prey relationships) to the university-level curriculum (genetic function in embryos).	<a href="https://depts.washington.edu/vurchin/?view=&amp;main">https://depts.washington.edu/vurchin/?view=&amp;main</a>
20. Pbs.org. The evolutionary laboratory of this site makes phylogeny and evolutionary history accessible to all students, while developing an understanding of the fossil record, the role of DNA in evolution and an introduction to biogeography. Your students can also play the role of a molecular engineer solving RNA folding puzzles (as shown above).	<a href="http://www.pbs.org/wgbh/nova/labs/">http://www.pbs.org/wgbh/nova/labs/</a>
21. Teachchemistry. They constantly produce high quality resources, including laboratories, demonstrations and activities. The best part is that your resources are organized by grade and subject, including tons for elementary school teachers.	<a href="https://teachchemistry.org">https://teachchemistry.org</a>
22. Middleschoolchemistry. This site is perfect for high school students, but if you teach introductory chemistry or physical sciences, the level of materials is also perfect for grades 9-10. Lesson plans are easy to find and some are even available in Spanish for English learners!	<a href="https://www.middleschoolchemistry.com">https://www.middleschoolchemistry.com</a>

<p>23. Annenberg Interactives.</p> <p>Available for Earth Sciences are high school basic. Dynamic Earth Interactive takes students through a visual party to teach the layers of the Earth and plate tectonics, and can be extended through the ideas presented in the Rock Cycle and Volcanoes Interactives.</p>	<p><a href="https://www.learner.org/interactives/">https://www.learner.org/interactives/</a>  <a href="https://www.learner.org/interactives/dynamicearth/">https://www.learner.org/interactives/dynamicearth/</a>  <a href="https://www.learner.org/interactives/rockcycle/">https://www.learner.org/interactives/rockcycle/</a>  <a href="https://www.learner.org/interactives/volcanoes/">https://www.learner.org/interactives/volcanoes/</a></p>
<p>24. The 30 Best Science Websites for Grades K-12.</p>	<p><a href="https://www.weareteachers.com/best-science-websites/">https://www.weareteachers.com/best-science-websites/</a></p>
<p>25. Interactive Science Websites for the Classroom.</p>	<p><a href="https://www.thoughtco.com/interactive-science-websites-3194782">https://www.thoughtco.com/interactive-science-websites-3194782</a></p>
<p>26. Popular Science Websites for Students.</p>	<p><a href="https://education.cu-portland.edu/blog/classroom-resources/popular-science-websites-for-students/">https://education.cu-portland.edu/blog/classroom-resources/popular-science-websites-for-students/</a></p>
<p>27. Educatorstechnology.</p> <p>A working formula for a successful learning activity with children involves three main elements: commitment, interactivity and fun. The more elements a learning activity exhibits, the better learning experiences it can generate. With the use of digital technologies, any teacher, no matter what subject he teaches, can easily integrate these elements into his classroom instruction thus creating optimal learning experiences that lead to deep understanding. Based on this learning philosophy, we have selected for you these science-centered educational websites for use with children and youth. The websites offer a wide variety of practical activities, interactive games, quizzes, virtual experiments and various other materials to engage young minds in immersive learning experiences that encompass various scientific topics and phenomena. Using a mixture of scientific knowledge and technology, children can explore the world of science in fun and engaging ways.</p>	<p><a href="https://www.educatorstechnology.com/2018/08/5-great-science-websites-for-young.html">https://www.educatorstechnology.com/2018/08/5-great-science-websites-for-young.html</a>  <a href="https://www.educatorstechnology.com/2017/09/3-good-educational-websites-for-science.html">https://www.educatorstechnology.com/2017/09/3-good-educational-websites-for-science.html</a></p>
<p>28. Top Science Websites for Interactive Learning.</p>	<p><a href="https://www.pinterest.es/pin/82120393183647094/">https://www.pinterest.es/pin/82120393183647094/</a></p>
<p>29. The best websites for expanding your scientific knowledge.</p>	<p><a href="https://www.howtogeek.com/120865/the-best-websites-for-expanding-your-scientific-knowledge/">https://www.howtogeek.com/120865/the-best-websites-for-expanding-your-scientific-knowledge/</a></p>
<p>30. Interactivesites weebly.</p> <p>Interactive, educational and online games and simulations</p>	<p><a href="http://interactivesites.weebly.com/science.html">http://interactivesites.weebly.com/science.html</a></p>
<p>31. Worldtouringexhibitions.</p> <p>Come experience science, mathematics, physics, natural disasters, nature, solar energy, biology, music and more while having fun at the Interactive Science exhibition.</p>	<p><a href="https://www.worldtouringexhibitions.com/interactive-science">https://www.worldtouringexhibitions.com/interactive-science</a></p>
<p>32. Top Science Websites for Interactive Learning.</p>	<p><a href="https://gettingnerdywithmelandgerdy.com/top-science-websites-for-interactive-learning/">https://gettingnerdywithmelandgerdy.com/top-science-websites-for-interactive-learning/</a></p>
<p>33. Science Learning Websites.</p>	<p><a href="https://www.edtechlens.com/blog/science-learning-websites">https://www.edtechlens.com/blog/science-learning-websites</a></p>
<p>34. Kids' Science Websites That Every Teacher Needs to Explore.</p>	<p><a href="https://www.brighthubeducation.com/elementary-school-activities/116335-great-interactive-kids-science-websites-to-supplement-learning/">https://www.brighthubeducation.com/elementary-school-activities/116335-great-interactive-kids-science-websites-to-supplement-learning/</a></p>
<p>35. 13 Free Easy Interactive Science Websites for Teachers.</p>	<p><a href="https://mycalcas.com/2017/07/13-free-easy-interactive-science-websites-teachers/">https://mycalcas.com/2017/07/13-free-easy-interactive-science-websites-teachers/</a></p>

36. Ten Websites for Science Teachers.	<a href="https://www.edutopia.org/blog/websites-for-science-teachers-eric-brunsell">https://www.edutopia.org/blog/websites-for-science-teachers-eric-brunsell</a>
37. SCIENCE KidSites.com.	<a href="http://www.kidsites.com/sites-edu/science.htm">http://www.kidsites.com/sites-edu/science.htm</a> <a href="http://www.sciencekids.co.nz/gamesactivities.html">http://www.sciencekids.co.nz/gamesactivities.html</a> <a href="http://www.sheppardsoftware.com/science.htm">http://www.sheppardsoftware.com/science.htm</a>
38. Best Science Websites for Teachers.	<a href="https://choosetwine.com/science-resources">https://choosetwine.com/science-resources</a>
39. A Really Big List of Free Science Websites for Kids.	<a href="https://parentingchaos.com/science-websites-for-kids/">https://parentingchaos.com/science-websites-for-kids/</a>
40. Science for Kids.	<a href="https://www.giftedkids.ie/science.html">https://www.giftedkids.ie/science.html</a>
41. Best Science YouTube Channels.	<a href="https://tutorful.co.uk/blog/insanely-awesome-science-websites-and-resources-that-will-expand-your-mind#best-science-youtube-channels">https://tutorful.co.uk/blog/insanely-awesome-science-websites-and-resources-that-will-expand-your-mind#best-science-youtube-channels</a>
42. Open-and-go lessons that inspire kids to love science!	<a href="https://mysteryscience.com">https://mysteryscience.com</a>
43. 8 Awesome Earth Science Apps, Websites and Games.	<a href="https://thejournal.com/articles/2018/06/05/8-awesome-earth-science-apps-websites-and-games.aspx">https://thejournal.com/articles/2018/06/05/8-awesome-earth-science-apps-websites-and-games.aspx</a>
44. Learning science.	<a href="https://learningscience.co.uk/blog/2018/7/5/wow-science-a-new-child-friendly-primary-science-website">https://learningscience.co.uk/blog/2018/7/5/wow-science-a-new-child-friendly-primary-science-website</a>
45. 30 AWESOME Interactive Websites for Elementary to Middle School Classrooms [COMMON CORE].	<a href="https://www.player.one/30-awesome-interactive-websites-elementary-middle-school-classrooms-common-core-338198">https://www.player.one/30-awesome-interactive-websites-elementary-middle-school-classrooms-common-core-338198</a>
46. The Ultimate STEM Guide for Kids: 239 Cool Sites About Science, Technology, Engineering and Math.	<a href="https://www.mastersindatascience.org/blog/the-ultimate-stem-guide-for-kids-239-cool-sites-about-science-technology-engineering-and-math/">https://www.mastersindatascience.org/blog/the-ultimate-stem-guide-for-kids-239-cool-sites-about-science-technology-engineering-and-math/</a>
47. Fun and Free Educational Websites for Kids.	<a href="https://www.verywellfamily.com/best-free-educational-websites-for-kids-3129084">https://www.verywellfamily.com/best-free-educational-websites-for-kids-3129084</a>
48. A world class science education for every student.	<a href="https://stileeducation.com">https://stileeducation.com</a>

<b>DIGITAL CREATION RESOURCES</b>	
NAME	ELECTRONIC ADDRESS
1. Pixlr. Full image editor with which you can modify, crop and add text to your photographs. In addition to the online version, it has apps for iOS and Android.	<a href="https://pixlr.com">https://pixlr.com</a>
2. BeFunky. Perfect if you are looking for a photo editor with more customization options: retouching and filters, frames, insertion of graphics and drawings, textures ... In addition, you can create collages or montages as posters, invitations or posters.	<a href="https://www.befunky.com">https://www.befunky.com</a>
3. Audacity. Free and free multiplatform audio editor, with which you can record, modify and export or save the result in different formats.	<a href="https://audacity.es">https://audacity.es</a>
4. Fotobabble.	<a href="http://www.fotobabble.com">http://www.fotobabble.com</a>

Simple tool to add audio to images. Just select a photo of your own, from the Internet or from your Facebook account and record your voice through the computer's microphone. It also has an app version for iOS.	
5. Screencast-O-Matic. Instrument to make screen or video recordings with the webcam and edit them, very useful for creating video lessons easily. The free version allows 15-minute recordings and includes the logo of the program, but it is perfectly operational.	<a href="https://screencast-o-matic.com/home/">https://screencast-o-matic.com/home/</a>
6. EDpuzzle. This tool allows you to customize existing or created videos for you and add interactive and motivating content for your students, such as comments or questions. Available online, it is in full development of apps and already has an extension for Chrome that allows you to edit YouTube videos.	<a href="https://edpuzzle.com">https://edpuzzle.com</a>
7. Prezi. One of the most popular presentation creation tools in the educational and professional fields. It allows to make very visual and dynamic presentations, from templates and in a very intuitive way, incorporating multimedia elements. Although it is paid, it offers a free 14-day trial. These tutorials in Spanish explain the keys to the tool.	<a href="https://prezi.com">https://prezi.com</a>
8. PowToon. To create presentations in animated format, with movement and sounds. Although it has paid versions, the free one allows you to use different styles and make presentations of up to five minutes.	<a href="https://www.powtoon.com/home/g/es/">https://www.powtoon.com/home/g/es/</a>
9. Genial.ly. Interesting free online software that allows you to create slides with text, images, interactivity, animations and all kinds of resources from your library, simply dragging the elements to the blank space.	<a href="https://www.genial.ly">https://www.genial.ly</a>

<b>ICT RESOURCES IN THE CLASSROOM</b>	
NAME	ELECTRONIC ADDRESS
1. ICT resources for English classes.	<a href="http://www.educacontic.es/blog/recursos-tic-para-las-clases-de-ingles">http://www.educacontic.es/blog/recursos-tic-para-las-clases-de-ingles</a>
2. Recursos TIC y Más. Web to help primary teachers in their classes with interesting web applications, new methodologies, resources for the day to day of the classroom ... in short, a space where useful elements for the teacher 2.0 will be collected.	<a href="http://recursosticymas.blogspot.com/2014/09/recursos-futuros-maestros-temario-oposiciones-maestros-primaria-2015-descarga-resumenes-gratis.html">http://recursosticymas.blogspot.com/2014/09/recursos-futuros-maestros-temario-oposiciones-maestros-primaria-2015-descarga-resumenes-gratis.html</a>
3. Laconstrucciondelaprendizaje. Educational games are an easy and entertaining way to learn while playful, children have fun playing but we remain calmer if at the same time acquire knowledge, I leave a series of gamification tools to perform in the classroom.	<a href="http://laconstrucciondelaprendizaje.blogspot.com/p/aplicaciones-educativas.html">http://laconstrucciondelaprendizaje.blogspot.com/p/aplicaciones-educativas.html</a>
4. Teacher's blog for the English signature in Primary. Reflections and ICT resources for teachers.	<a href="https://sites.google.com/site/letsticenglish/">https://sites.google.com/site/letsticenglish/</a>
5. 10 online tools to energize, gamify and customize your classes.	<a href="https://eleinternacional.com/blog/10-herramientas-online-para-dinamizar-gamificar-y-personalizar-tus-clases-de-espanol-ii/">https://eleinternacional.com/blog/10-herramientas-online-para-dinamizar-gamificar-y-personalizar-tus-clases-de-espanol-ii/</a>



6. Teachers in trouble. 12 educational blogs you need.	<a href="https://www.colejobs.es/blog/index.php/2016/01/21/profesores-en-apuros-12-blogs-educativos-que-necesitas/">https://www.colejobs.es/blog/index.php/2016/01/21/profesores-en-apuros-12-blogs-educativos-que-necesitas/</a>
7. Blogs with resources for children.	<a href="https://www.educaciontrespuntocero.com/experiencias/blogs-2/blogs-con-recursos-para-infantil/19758.html">https://www.educaciontrespuntocero.com/experiencias/blogs-2/blogs-con-recursos-para-infantil/19758.html</a>
8. 6 resources to learn English through the network.	<a href="http://blog.tiching.com/6-recursos-para-aprender-ingles-traves-de-la-red/">http://blog.tiching.com/6-recursos-para-aprender-ingles-traves-de-la-red/</a>
9. 70 essential teachers blogs.	<a href="https://www.educaciontrespuntocero.com/recursos/blogs-docentes-imprescindibles/34517.html">https://www.educaciontrespuntocero.com/recursos/blogs-docentes-imprescindibles/34517.html</a>
10. Espe's blog.	<a href="http://espemoreno.blogspot.com">http://espemoreno.blogspot.com</a>

ICT PUBLICATIONS	
NAME	ELECTRONIC ADDRESS
Cada profesor tiene su propia receta TIC que después cocina en el aula.	<a href="https://www.magisnet.com/2018/09/cada-profesor-tiene-su-propia-receta-tic-que-despuas-cocina-en-el-aula/">https://www.magisnet.com/2018/09/cada-profesor-tiene-su-propia-receta-tic-que-despuas-cocina-en-el-aula/</a>
Recursos TIC para Educación Infantil.	<a href="http://recursos-tic-alba-sanchez-alonso.blogspot.com/2016/01/vocabulario-en-ingles.html">http://recursos-tic-alba-sanchez-alonso.blogspot.com/2016/01/vocabulario-en-ingles.html</a>
LAS TIC EN LA EDUCACIÓN.	<a href="https://medac.es/articulos-educacion-infantil/las-herramientas-tic-en-la-educacion/">https://medac.es/articulos-educacion-infantil/las-herramientas-tic-en-la-educacion/</a>
El maestro de las TIC.	<a href="http://educacion.press/2017/06/13/el-maestro-de-las-tic/">http://educacion.press/2017/06/13/el-maestro-de-las-tic/</a>