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LAS TIC, TAC, TEP, TRIC EN LAS SITUACIONES DE APRENDIZAJE

ITC, TLK, TEP, RICT IN THE LEARNING SITUATIONS

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Abstract

Information and Communication Technologies (ICT) are integrated into our society: the learning society. The Technologies of Learning and Knowledge (TLK) and Technologies for Empowerment and Participation (TEP) make sense in the current situation we are experiencing to motivate students, enhance their creativity and increase their skills. Finally, Relationship, Information and Communication Technologies (RICT) favor interaction between students and teachers in a horizontal relational plane, empowering through practical activities. All of them: ITC-TLK-TEP-RICT have great advantages in the teaching-learning process and are therefore integrated into the learning situations that must be developed in the classroom. It is necessary that through the key and specific competences that we see in the new curricular development, it is possible to sensitize all the agents involved in the educational centers so that they add these

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elements to the learning situations seeking an improvement in the quality of education that helps to create better people for our society. Here the elements of the curriculum related to these elements and the digital competences through the ITC-TLK-TEP-RICT are analyzed in the learning situations.

Keywords: *531204 Education, 580100 educational theory and methods, 610402 educational methods, 630707 technology and social change.*

1. INTRODUCTION

Information and Communication Technologies (ICT) are fully integrated in our society: in the current learning society as explained by López Company (2021). In the Organic Law 3/2020 which modifies the Organic Law 2/2006 of May 3 of Education (LOMLOE) and its curricular concretion in the Royal Decree 157/2022, of March 1, which establishes the organization and minimum teachings of Primary Education (RD 157/2022) and in the Valencian Community in the Decree 106/2022, of August 5, of the Consell, on the organization and curriculum of the Primary Education stage (D 106/2022), in its pedagogical principles establishes that the educational intervention through learning situations will seek to develop digital competence. The exit profile states that they will critically analyze and take advantage of the opportunities of all kinds offered by today's society, particularly those of culture in the digital era, assessing their benefits and risks and making an ethical and responsible use that contributes to the improvement of personal and collective quality of life. Framed in the digital competence (DC), which implies the safe, healthy, sustainable, critical and responsible use of digital technologies for learning,

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for work and for participation in society, as well as the interaction with these we will see why it is necessary to work with them through learning situations. This competence includes information and data literacy, communication and collaboration, digital content creation, security, digital citizenship issues, problem solving and computational and critical thinking. Therefore, these situations should be developed through ICTs (Information and Communication Technologies) and TLK (Technologies for Learning and Knowledge). Their use in the classroom increases the quality of our teaching and learning process. It requires, on the one hand, teacher training and, on the other hand, a responsible use of them to achieve the digital competence that we see in the current regulations. ICTs have revolutionized the way we communicate; the way we access information and the way we integrate new learning. López Company (2021) details that all this revolution has not gone unnoticed in the educational context with the aim of implementing these tools and thus obtaining a significant improvement in the teaching-learning process and, therefore, in the quality of education.

Technologies for Learning and Knowledge (TLK) is a concept created by Vivancos (2008) to explain the new possibilities that technologies open to education, when they are no longer used as a merely instrumental element whose purpose is to make the current educational model more efficient. Lozano (2011) defines ICTs as those that guide ICTs towards more formative uses, both for the student and the teacher, with the aim of learning more and better. They focus especially on methodology, on the uses of technology and not only on ensuring mastery of a series of computer tools. In short, to know and explore the possible didactic uses of ICT for learning and teaching. In other words, ICT go beyond learning how to use ICT and are committed to exploring these technological tools at the service of learning and knowledge acquisition. The purpose of ICT is to use

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and learn about technology (Vivancos 2008) in the teaching and learning process as an improvement, to learn more and better and to ensure that our students acquire competencies; this is the objective that the school must face. What is proposed is to change the 'learning of technology' for 'learning with technology', an approach oriented to the development of methodological competences such as learning to learn (Lozano 2011). The "ICT model" is linked to 20th century society and the TAC model to 21st century society.

Also, Technologies for Empowerment and Participation (TEP) makes sense when users can interact and collaborate with each other as creators of user-generated content in a virtual community, as opposed to static websites where users are limited to passive observation of content that has been created for them (López Company, 2021).

Finally, the evolution of today's society makes digital resources motivate students in the teaching process, resulting in a much more playful and accessible learning for them. In this sense, it is necessary to talk about Relationship, Information and Communication Technologies (ICT), which involve a change of the teacher from his usual role to guide the Teaching-Learning process. TRICs favor the relationship of students and their interaction, both between students and teachers on a horizontal level, promoting the creation of social relationships in the classroom through activities of a more practical nature.

If we learn to properly use ICTs, TLKs, PETs and RICTs to motivate the students we have in the educational centers, enhance their creativity and increase their multitasking skills, we will shape an increased learning. Through these elements we will be able to develop competencies within learning situations so that students can develop in this environment with

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their own resources and be autonomous in their use and in the learning of new tools and skills.

2. METHOD

Por todo esto, vamos a analizar diferentes elementos que nos van a servir para conocer la integración de estos elementos (TIC-TAC-TEP-TRIC) dentro de las situaciones de aprendizaje ejemplificando también de manera práctica algunas de ellas.

2.1 **Key and specific competences**

In order to focus on learning situations, it is necessary to develop and base ourselves on the analysis of the different key and specific competences. The key competences, according to RD 157/2022, are the performances that are considered essential for students to progress with guarantees of success in their educational itinerary and to face the main global and local challenges. As for the specific competencies of the areas, they are the performances that students must be able to develop in activities or learning situations whose approach requires the basic knowledge of each area or field. The specific competencies constitute an element of connection between the student's exit profile and the basic knowledge of the areas or domains and the evaluation criteria.

The key competencies to be acquired respond to the need to link these competencies with the challenges of the 21st century, with the principles and purposes of the educational system established in the LOE/LOMLOE and with the school context. The competencies most closely related to these elements that we are analyzing are:

Digital competence (DC) involves the safe, healthy, sustainable, critical, and responsible use of digital technologies for learning, for work and for participation in society, as well as the interaction with these. It

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includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), security (including digital well-being and cybersecurity skills), digital citizenship issues, privacy, intellectual property, problem solving, and computational and critical thinking. It has a direct link to the ICT- TLK-TEP- RICT.

Competence in mathematics, science and technology (CMST) involves understanding the world using scientific methods, mathematical thinking and representation, technology and engineering methods to transform the environment in an engaged, responsible and sustainable way. Mathematical competence enables the development and application of mathematical perspective and reasoning in order to solve various problems in different contexts or learning situations. Competence in science involves understanding and explaining the natural and social environment, using a set of knowledge and methodologies, including observation and experimentation, in order to pose questions and draw conclusions based on evidence to be able to interpret and transform the natural world and the social context. The latter is directly related to the ICT- TLK-TEP-TRICT.

On the other hand, personal, social and learning to learn competence (PSLLC) involves the ability to reflect on oneself in order to accept oneself and promote constant personal growth. It also includes the ability to cope with uncertainty and complexity. Finally, citizenship competence (CC) helps students to exercise responsible citizenship and participate fully in social and civic life.

In terms of specific competences, Specific Competence 1 details the use of digital devices and resources in a safe, responsible and efficient way, to search for information, communicate and work individually, in teams and in networks, and to rework and create digital content according to the digital needs of the educational context. The variety of devices and

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applications that exist today and that we can use with ICT-TLK-TEP-ICT makes it necessary to introduce the concept of digitization of the personal learning environment, understood as the set of devices and digital resources that each student uses according to his or her learning needs and that allow him or her to perform tasks efficiently, safely and sustainably, carrying out a responsible use of digital resources. Therefore, this competence aims to prepare students to develop in a digital environment that goes beyond the mere handling of devices and the search for information on the network. The development of digital competence will allow understanding and valuing the use given to technology; developing strategies of interpretation, organization, and analysis of information; reelaborating and creating content; communicating through computer media, and working in teams, necessarily linked to the ICT-TLK-TEP-TRIC. Likewise, this competence implies knowing strategies to make a critical and safe use of the digital environment, being aware of the risks, learning how to avoid or minimize them, asking for help when necessary and solving possible technological problems in the most autonomous way possible.

2.2 **Basic knowledge and the different areas**

For the development of these elements in the learning situations it is necessary to contextualize them in the different areas and basic knowledge more related to the development of these competences and in relation to the ICT-TLK-TEP- RICT and according to the RD 157/2022 and D 106/2022 they would be:

The area of Knowledge of the Natural, Social and Cultural Environment through the digitization of learning environments. Through them students must make a safe, effective and responsible use of technology, which, together with the promotion of entrepreneurship and

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the development of basic skills and techniques of the technological process, will facilitate the realization of cooperative interdisciplinary projects in which a problem is solved or a response is given to a need of the immediate environment, so that students can provide creative and innovative solutions through the development of a final prototype. Within this through the block of "Technology and digitalization" is oriented, on the one hand, to the application of strategies for the development of design projects and computational thinking, for the creation of products in a cooperative manner, to solve and provide solutions to specific problems or needs. On the other hand, this block also seeks the learning, by the students, of the basic handling of a variety of digital tools and resources to satisfy their learning needs, to search and understand information, to reelaborate and create content, to communicate effectively and to develop in a digital environment in a responsible and safe way.

The basic knowledge that will develop the skills and competencies needed to use the ICT-TAK-TEP-RICT would be:

B. Technology and digitalization. 1. Digitalization of the personal learning environment. Through the devices and resources of the digital learning environment according to the needs of the educational context. In addition, with digital resources to communicate with familiar people in familiar and safe environments. 2. Design projects and computational thinking. Through the phases of design projects; suitable materials to achieve a design project; initiation in programming through analog or digital resources adapted to the reading level of students (unplugged activities, digital platforms for initiation in programming, educational robotics ...), and basic teamwork strategies.

As the 2030 Agenda also includes the priority objective of combating climate change, learning situations that promote the internalization of the

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sustainable perspective are recommended. On the one hand, students are involved in the conservation of school material, equipment and infrastructures by reflecting on the rules and values underlying their actions and analyzing incidents; the tasks of sorting classroom waste for recycling; the rational consumption of water and electricity promoted through center and classroom projects; the care of the school garden, etc. On the other hand, students are encouraged to participate in campaigns to collectively plan and implement innovative actions that promote sustainability at school and local level and to collaborate with NGOs, associations and institutions committed to environmental causes. As in other areas, information and communication technologies can amplify the impact of all kinds of actions, and resources such as school podcasts, radio and online television are very effective for disseminating awareness-raising messages related to sustainable development.

On the other hand, the area of Mathematics through the competence of construction and application of simple algorithms to face situations and solve relevant problems in the personal, educational, or social field, organizing data, decomposing a problem into parts, recognizing patterns, and using ICT tools, in addition to the TLK-TEP- RICT.

This competence implies that students solve personal, educational, or social problems and situations by implementing an algorithm or finite sequence of precise instructions and rules. This solution can be executed by a human, an educational robot, or a computer system at a visual programming level. Codes such as sequences of arrows, visual languages or the initiation of block programming will be used. The design and implementation of an algorithm involves skills such as the decomposition of a problem into simpler tasks; the identification of the relevant aspects of a situation to simplify and structure it, removing any ambiguity or

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imprecision; the ordering, classification, and organization of a set of data; or the identification of patterns in the development of a solution.

Students will approach learning situations in the personal, educational, and social spheres in which problem solving through computational thinking and the use of technological resources play a relevant role. During troubleshooting through computational thinking skills, students will have to cooperate and collaborate in groups, taking different roles (programmer, reviewer, executor, etc.).

In the first cycle, students should begin to develop the basics of computational thinking. They should be able to collaborate in groups to reproduce or design simple algorithms that will be executed by themselves, through their bodies or manipulative materials, using visual or arrow programming codes. Students should also be able to solve situations in which the solution must be implemented to a robot; for example, programming the instructions for a robot to follow a trajectory to solve the challenge or problem.

In the second cycle, students should begin to use block programming by means of some technological or computer tool, recognizing patterns and facing problems that need to be divided into parts. At the end of this stage, students should be able to design simple block programming algorithms, implement them with technological tools and, in some cases, make an informal analysis of their limitations.

In terms of the area's Basic Knowledge, we focus on computational thinking that allows us to develop techniques and strategies to obtain efficient solutions using sequences of orders. In primary education, this mathematical sense is applied in the identification of regularities, the creation of simple algorithms or the exploration of different options and strategies in a situation. It is worth highlighting the importance of the use of

Recepción: 24/02/2023 Aceptación: 20/04/2023

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ISSN 1886-5895

ICT- TLK-TEP-RICT and programming using blocks in which skills associated with the recognition and use of patterns for the design and analysis of more complex solutions are highlighted. The most important skills in this area are:

- Interpretation of routines or instructions with ordered steps. Predicting terms in sequences of figures or pictures or numbers.
- Predicting terms in numerical sequences. Creation of patterns.
- Interpretation, modification, and creation of simple algorithms.
- Interpretation and design of simple algorithms in spreadsheets and by block programming.
- Search and analysis of strategies in abstract games without hidden information or the presence of chance: chess, checkers, etc.
- Symbolization and obtaining of simple unknown data in expressions with equalities Assessment of the evolution of computational thinking and its social impact, incorporating the gender perspective.
- Cooperative work in situations involving design and application of algorithms.
- Learning strategies specific to computational thinking.

2.3 **Integration in learning situations**

The learning situations according to RD 157/2022 will be based on the development of the key competences of the student's exit profile at the end of basic education, which are specified in the specific competences of

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the area of the stage, is favored by the development of a didactic methodology that recognizes the students as agents of their own learning. For this purpose, it is essential to implement pedagogical proposals that, starting from the students' centers of interest and through the ICT-TLK-TEP-RICT, allow them to build knowledge with autonomy and creativity from their own learning and experiences. Learning situations represent an effective tool to integrate the curricular elements of the different areas through meaningful and relevant tasks and activities to solve problems in a creative and cooperative way, reinforcing self-esteem, autonomy, reflection, and responsibility.

For the acquisition of competencies to be effective, learning situations must be well contextualized and respectful of students' experiences and their different ways of understanding reality. These situations concretize and evaluate the students' learning experiences and must be composed of tasks of increasing complexity, according to their psycho-evolutionary level, whose resolution involves the construction of new learning. The aim is to offer students the opportunity to connect their learning and apply it in contexts close to their daily lives, thus favoring their commitment to their own learning. Thus, the learning situations constitute a component that, aligned with the principles of Universal Design for Learning (UDL), allows learning to learn and lay the foundations for lifelong learning by promoting flexible and accessible pedagogical processes that adjust to the needs, characteristics, and different learning rhythms of students.

The design of learning situations should involve the transfer of the learning acquired by the students, enabling the coherent and effective articulation of different knowledge, skills, and attitudes of this stage. The situations must be based on the proposal of clear and precise objectives that integrate diverse basic knowledge. In addition, they should propose scenarios that favor different types of groupings, from individual work to

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group work, allowing students to progressively assume personal responsibilities and act cooperatively in the creative resolution of the challenge posed. Its implementation should involve oral production and interaction and include the use of authentic resources in different media and formats, both analog and digital. Learning situations should promote aspects related to common interest, sustainability, or democratic coexistence, which are essential for students to be prepared to respond effectively to the challenges of the 21st century, as we have seen previously in the ICT-TLK-TEP- RICT.

These learning situations according to the D 106/2022 will be related to the personal and educational environment, i.e., starting from the environment closest to the students and related to their daily lives, to reach the closest social environment. They will be based on real issues and problems of the natural and social environment for students to develop, in meaningful contexts, values and skills that favor a full life and a conscious and responsible citizenship. That is why the work will be directed towards practical, real, and meaningful final products for the students. They will be prepared to face the challenges and needs that the learning society is demanding from them, especially at this moment through learning situations.

We have spoken at a theoretical level, so now we will go deeper into the practical part with examples that demonstrate what was detailed above. Some examples that can be used in learning situations using the ICT-TLK-TEP-RICT include the following:

- A virtual theft is discovered in the classroom that you must solve.
- We create a time machine that allows us to travel between eras.

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- We prepare the virtual menu of a restaurant.
- We prepare a presentation with ICT.
- You will be the protagonist and director of a movie.
- An alien lands in the school playground.
- You get lost in a giant maze and you have to get out using programming.
- You have to organize and prepare a radio program for the whole school.

With this last example we briefly develop the last proposal carried out based on López Company (2021). In this learning situation, we propose to organize a radio program for the whole school with the following project objectives:

- Create different varied radio programs and share them with the school.
- Know the different types of programs and/or applications to make recordings.
- Work cooperatively as a team, sharing roles, making an effort, and respecting classmates.
- Use ICT-TLK-TEP-RICT and TLK developing a critical spirit.
- Develop the construction of visual and audiovisual proposals.
- Respect all the people who are part of their group promoting educational inclusion.

Recepción: 24/02/2023 Aceptación: 20/04/2023

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The aim is to work with students in fifth or sixth grade where actions will be planned and programs will be made, varying the topics according to the needs and interests of the students. The roles of each person in the group will be distributed so that they can design and plan a program and then record it. The programs can be: free, music, endangered animals, SDGs, how to combat climate change, promote sustainable actions, coexistence and mediation, emotions, interviews, collaboration with NGOs, Service Learning (SL), etc. At each stage, there is a work planning, information search and research on the topics to be addressed, creation of the final work and recording and exhibition of the work in the classroom, dissemination and listening of the final productions in the school and final evaluation.

The work in the different interdisciplinary areas will depend on the type of program and its contents, but basically the work with technologies and languages, since dialogue will be used to solve interpersonal conflicts, listening actively, identifying, and respecting the emotions and the content of the interlocutor's speech, exposing and reformulating in an organized way their opinions with a respectful language. On the other hand, it will be necessary to identify, classify and compare the social media: radio, cinema, advertising, television, internet, etc. Identification of informative, opinion and persuasive subgenres: news, interview, report, debate, advertising. Comprehension of oral texts from radio and television or the Internet to obtain general information about facts and current events and as a tool for learning and access to information and experiences of others that are significant. The methodology will be based on cooperative learning, flipped classroom and project-based learning, among others. In these groups a group identity will be favored collectively, but with a need for individual research by the members where it will be appreciated with the public presentation of the tasks performed, contributing to the development of

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communication skills, group work and flexibility of thought. Some useful programs to create this type of content can be Audacity or Rec Studio. You can create podcasts with voice accompanied by music and sound effects with an electronic device (tablet, computer, or cell phone).

We propose more practical elements that can be applied and used in learning situations through ICT-TLK-TEP-TEP-RICT as classroom resources. An example of ICT would be the use of digital devices to write a paper using a text editor, presentations or even search for information through Internet search engines.

The use of TLK with the use of cloud storage media, email and digital teaching platforms (Aules). Some programs to create content can be Canva or Genially. These programs allow you to design interactive content in a simple way, make presentations, infographics, educational breakouts, videos, mind maps, etc. They are perfect for producing visual content that captures the attention of students by offering the basic tools to create their own designs and give free rein to their imagination. With the TEP we refer to social networks, forums, blogs where there is digital communication, ideas are contributed, opinions are generated, and there is active participation. A related program could be Kahoot or Quizziz. Platforms that allow to generate evaluation questionnaires in a contest format, through a playful, fun and dynamic learning. With the RICT we can also create relationships through different platforms such as blogs or VideoBlogs where sharing and exchange are favored through interactivity, motivation, in short, the consolidation of the ICT-TLK-TEP-TEP-RICT succession.

Recepción: 24/02/2023 Aceptación: 20/04/2023

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3. RESULTS

By analyzing in-depth the different areas and how their learning situations should be, we have verified that according to the LOMLOE and detailed in the RD 157/2022, they are situations and activities that involve the deployment by the students of actions associated with key competences and specific competences and that contribute to the acquisition and development of these competences. The link between key competences (analyzed above) and challenges of the 21st century (among which are ICT, TLK, TEP, RICT) is what will give meaning to learning, by bringing the school closer to real situations, issues and problems of everyday life, which, in turn, will provide the necessary support point to promote meaningful and relevant learning situations, both for students and for teachers. The aim is to ensure that every student who successfully completes basic education and, therefore, reaches the Exit Profile knows how to activate the acquired learning to respond to the main challenges he/she will face throughout his/her life:

- Critically analyze and take advantage of the opportunities of all kinds offered by today's society, particularly those of culture in the digital era, assessing their benefits and risks and making an ethical and responsible use that contributes to improving the quality of personal and collective life.

- Accept uncertainty as an opportunity to articulate more creative responses, learning to manage the anxiety that may be associated with it.

- Cooperate and live together in open and changing societies, valuing personal and cultural diversity as a source of wealth and taking an interest in other languages and cultures.

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ISSN 1886-5895

- Feel part of a collective project, both locally and globally, developing empathy and generosity.

- Develop the skills that allow them to continue learning throughout life, from the confidence in knowledge as a driver of development and critical assessment of the risks and benefits of the latter.

In this sense, learning situations must be an open space that encourages students' curiosity and analytical observation to build their personal position facing reality, a position that must be considered potentially transforming the existing social reality.

For the development of learning situations in each of the areas we must consider the elements we have detailed above. For example, for Knowledge of the Natural, Social and Cultural Environment we rely on problem solving through design projects and the application of computational thinking, to cooperatively generate a creative and innovative product that responds to specific needs.

Development of projects based on cooperative activities involves the coordinated, joint and interdisciplinary development of basic knowledge from different areas to respond to a challenge or problem of the physical, natural, social, cultural or technological environment, using techniques specific to the development of design projects and computational thinking. The detection of needs, the design, the creation, and testing of prototypes, as well as the evaluation of the results, are essential phases in the development of design projects to obtain a final product. On the other hand, computational thinking uses the decomposition of a problem into simpler parts, pattern recognition, modeling, selection of relevant information and creation of algorithms to automate everyday processes.

Recepción: 24/02/2023 Aceptación: 20/04/2023

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The two strategies are not mutually exclusive, so they can be used together according to the needs of the project.

This type of project also fosters creativity and innovation by generating learning situations in which there is no single correct solution, but rather every decision, whether wrong or right, is presented as an opportunity to obtain valid information that will help to develop a better solution. These situations also provide a suitable environment for cooperative work, where skills such as argumentation, effective communication of complex ideas, shared decision making, and dialogue-based conflict management are developed.

When setting the tasks, the problems or challenges selected should pose a challenge adapted to their age, and will be posed by promoting play and exploration, which are natural forms of learning in childhood. The knowledge mobilized will most of the time be interdisciplinary, due to the characteristics of an environment in which all dimensions are interrelated, developing in students the ability to observe reality in a global way.

It is especially interesting to start from the challenges of the 21st century and the Sustainable Development Goals (SDGs), as well as to always have a perspective of coeducation and respect for diversity in the design and development of learning activities.

The characteristics of the area facilitate active learning based on research and problem solving, mobilizing different skills and knowledge, and acquiring several specific competencies at the same time. The learning situations will create contexts where students will actively work on strategies for searching and selecting information, storing, and processing data, and creating and communicating content. Students will develop their capacity for reflection, observation, inquiry, and argumentation in a meaningful, applicable, and as real and as close as possible. For all this, it is

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essential to guide students in the use of work strategies of the scientific method, computational thinking, or design thinking, as appropriate.

This work process is the ideal context for an efficient, appropriate, and safe use of digital resources and devices, in addition to analog information sources. It is the context in which virtual learning environments will naturally be used to enable communication between students and teachers, synchronous and asynchronous learning and the sharing of the work done. All this without forgetting all the opportunities that this area provides to get in contact with the environment, through visits, contact or collaborations that bring it even closer to the students' daily life, giving them a more active role, with the responsibility that this entails.

All this will be done mainly through cooperative work, in which students of different characteristics will alternate different roles to achieve joint learning, developing democratic values and a sense of belonging and contribution.

When creating these learning situations, it will be essential to reduce as much as possible the barriers that impede the physical, cognitive, sensory and emotional accessibility of students, guaranteeing the possibility of participating and learning through the incorporation of the principles of Universal Design for Learning (UDL).

This work method encourages students to become progressively more autonomous in their learning. To encourage this, the role of the teacher is essential, facilitating a correct scaffolding and subsequent feedback, treating error as a natural and necessary part of learning. The evaluation will be mainly formative, permeating the whole process of students' work through the application of various instruments that will help them make decisions while working to enhance their learning and its

Recepción: 24/02/2023 Aceptación: 20/04/2023

https://doi.org/10.52149/Sp21
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quality. In this sense, rubrics, checklists, or portfolios, among other instruments, will be of great help.

On the other hand, in Foreign Language, these learning situations, in general, should incorporate the following elements:

- Raise situations related to current events.
- Pose a challenge (exigency).
- Incorporate different levels of difficulty (inclusion) through multilevel programming, as well as variety in their nature.
- Present the possibility of personalizing them (customization).
- Incorporate several phases that include reception, interaction, mediation, production, and a final reflection phase.
- Involve student cooperation through the mediation of concepts and/or communication and negotiation of meanings.
- Use analog and digital formats and tools (both in the educational as well as in the personal and social spheres).

Finally, in Mathematics, the development of specific mathematical competences leading to mathematical literacy, as part of the students' exit profile, is based on processes of real contexts and learning situations. Student performance requires the mobilization of a set of mathematical skills, procedures and concepts that enable them to successfully address the learning situations posed. Beyond the mere procedural domain, problem solving will form the core of learning in this subject.

As the stage progresses, students' actions should cover broader contexts, specific to the social or educational sphere. In learning situations,

Recepción: 24/02/2023 Aceptación: 20/04/2023

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students should be able to mobilize skills, knowledge, resources, including ICT tools, and attitudes to address the most general and relevant issues for citizenship, aimed at introducing the great challenges of the 21st century.

Students should solve learning situations that directly require the mobilization of mathematical competences, but they should also be able, progressively, to face situations in which they are expected to act in an indirect way, and to use their reading comprehension skills.

Therefore, in the first cycle they would have to build the contents intuitively and linked to contexts and experiences close to them. During the second and third cycles they would have to enrich their mathematical contents with connections and properties. In addition, students would have to establish conjectures and would have to ask themselves questions about phenomena and situations in their immediate environment, whose answers require mathematical reasoning, although initially in a more intuitive way. Mental processes favor intuitive understanding and definition, linked to the visualization and manipulation of concepts and procedures related to all the basic content groups: Numerical sense and its operations, Spatial and geometric sense, Measurement and estimation sense, Stochastic sense and computational thinking.

In the second cycle, students would have to broaden and deepen the meanings of mathematical concepts and procedures already formed and would have to begin to enrich them with connections, while continuing to develop new intuitive mathematical content from more complex learning situations. Students would have to use the procedures in a flexible way, knowing and comparing different ways of transforming and manipulating mathematical content.

The learning situations directly linked to the "Main challenges of the 21st century" are those that imply the realization of a set of activities close

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to the students, related to real situations that allow the integration of all the elements that constitute the process of teaching and learning competence. In other words, learning situations pose tasks in which students mobilize a set of competences, resources, and knowledge to solve them. In fact, the student's ability to act when faced with a learning situation requires mobilizing all types of knowledge involved in the specific competencies: concepts, procedures, attitudes, and values.

During this stage, the acquisition and development of the specific competences is limited to the personal and educational sphere, up to the immediate social sphere. In the case of mathematics, learning situations should propose a real or potential problem, whose tasks involve the skills and actions referred to in the specific competencies: solving problems; mathematical reasoning and establishing connections; modeling and applying mathematical tools to reality; implementing algorithms and methods of computational thinking; handling mathematical symbolism and its representations; communicating with mathematical language and about mathematics.

From this perspective, some of the criteria for designing learning situations are as follows:

a) The learning situations should pose a problem that corresponds to a real situation close to the students that serves to develop more than one competency.

b) The design of specific learning situations in the area of mathematics should involve concepts, procedures and attitudes linked to the mathematical senses of the stage: spatial sense, sense of measurement, number sense, computational thinking, and sense of statistics and probability.

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c) Learning situations should, as far as possible, be open-ended and gradable. That is, they should be sufficiently flexible and relevant to control the degree of accessibility and depth that allows their use to be adapted to the different levels of learners. Learning situations should contribute to eradicating preconceived misconceptions related to gender or innate talent.

d) Learning situations should be thought-provoking and promote the key competency of learning to learn and a critical approach.

e) Learning situations should allow an interdisciplinary treatment and connect with other mathematical learning experiences close to the students. From the personal and educational sphere, topics of interest should be addressed that allow approaching the main challenges of the 21st century. The design of learning situations should allow them to be addressed both individually and in groups, incorporating an inclusive approach and cooperative or collaborative work techniques.

f) The design of learning situations will include situations in which all the information necessary for their resolution is known, but also others in which it is required to complete, in a simple way, some missing information.

g) The design of learning situations should contemplate varied formats: verbal statements with or without supporting illustrations, statements with incorporation of different sources of information, and statements with some simple graphics.

4. DISCUSSION

As we have seen, ICT-TLK-TEP-TEP-RICT have great advantages in the teaching-learning process and are therefore integrated into the

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learning situations that should be developed in the classroom. It is necessary that through the key and specific competences that we see in the new curricular development, all the agents involved in the educational centers can be sensitized to add these elements to the learning situations looking for an improvement in the quality of education that helps to create better people for society. Here we have analyzed the elements of the curriculum related to these elements and digital competencies through ICT-TLK-TEP-TEP-RICT in learning situations.

In this type of activities, it is necessary to include elements that motivate the students so that through this motivation, learning is improved and they are more willing to actively participate in their own learning. On the other hand, there are elements that can impede the development of learning situations, such as the personal limitations of teachers, the technologies present in each educational center and the motivation of each of the agents carrying out the actions. Also limit the use of devices and digital resources according to their learning needs and that allow them to perform the tasks in an efficient, safe and sustainable way, carrying out a responsible and critical use of digital resources.

In this sense, the use of tasks, workspaces, the respectful use of them, in a way that they feel as their own elements, can help to create experiences more connected with the students and their needs to eradicate limitations. The elaboration of projects based on cooperative activities (as we saw in the practical experience) involves the development of the basic knowledge of the different areas to respond to a challenge or problem. Carrying out this type of project also fosters creativity and innovation by generating learning situations where there is no single correct solution and where ICT-TLK-TEP-TRICT is used as an opportunity to obtain valid information that will help to develop a better solution. These situations also provide a suitable environment for cooperative work, where

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skills such as argumentation, effective communication of complex ideas, shared decision making and conflict management in a dialogic way are developed.

When setting the tasks, the problems or challenges selected should pose a challenge, developing in the students the ability to observe reality in a global way. The aim is for students to be autonomous in order to know how to work cooperatively and for them to be aware of the possibility of creations and productions they can make. Likewise, it will be necessary to know strategies to make a critical and safe use of the digital environment, being aware of the risks, learning to avoid them, asking for help, and solving possible technological problems in the most autonomous way possible based on the challenges of the 21st century and the Sustainable Development Goals (SDGs) as we saw earlier in the development of learning situations.

CONCLUSIONS

One of the competences of our curriculum is digital competence and the mastery of ICT is introduced in all our educational legislation and regulations. With this analysis we intend to improve the digital competence and the improvement of the different competences that we have mentioned throughout the article.

We have addressed ICT, TAC, TEP and TRIC in the educational context and through a practical experience that has been carried out with students. This favors the implementation and use of ICT-TLK-TEP-RICT in different learning situations. The educational centers are integrated by the so-called digital natives and, therefore, we need a dynamic educational system and related to the current challenges and needs. Because only in this way, we

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will obtain citizens prepared to integrate into the social, cultural, labor, and economic context that the information society has prepared for them.

On the one hand, working with ICT-TLK-TEP-RICT has great advantages in the teaching-learning process and therefore it is necessary to raise awareness among all the agents involved in the educational centers, seeking an improvement in the quality of education that will help to create better people for society.

This investigation values positively the use of digital elements in learning situations, raising awareness and encouraging students to be autonomous in order to know how to work cooperatively and that they are aware of the possibility of creations and productions that can be made through ICT, TLK, TEP and RICT.

Therefore, it is necessary to promote and encourage the foundations of a training related to ICT, TLK, TEP and RICT to help them develop the key competencies that are sought as we have seen in the LOMLOE and RD157/2022 and D 106/2022 always favoring the integral development of students as detailed by López Company (2021).

The global use of ICTs, as well as the constant development of new technological applications, has triggered the appearance of different terms that help classify ICTs. If we take ICT as a basis, since it is the broadest term and encompasses the others, PET is an evolution of the previous ones towards participation and personal fulfillment, ultimately reaching TRIC. To achieve all this, TAC will be taken as a guide for good technological use, with the aim of promoting student learning through student participation, thus enhancing a social character in the classroom, as promoted by the TRIC.

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In short, cataloging a training action or activity in the field of ICT, TLK, TEP or RICT is not an essential aspect in the educational field, but it is advisable to know these concepts and promote them at school. In this way, it will be possible to motivate students who are digital natives, favoring their participation in the teaching-learning process by integrating them into learning situations.

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