Learning Styles Of University Students In Virtual Environments From A Teacher's Point Of View

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ABSTRACT

Although teachers use ICT in the sessions they teach, they do not take into account the way their students learn, but rather the ease with which they use the tools, thus presenting a lack of knowledge of the learning styles (LSS) of the students by their teachers. The objective is to interpret the AE in university students from the teacher's perception. The methodology follows the hermeneutic design from a qualitative approach, the technique was the interview, the instrument was the semi-structured interview guide, likewise, Atlas ti was used; finally, different emerging categories were identified.

Key words: distance education, learning style, teaching, university student.

Resumen

Los docentes, a pesar de emplear las TIC en las sesiones que imparten, no toman en cuenta la forma de aprender de sus estudiantes, sino en la facilidad de manejo de las herramientas, presentando así un desconocimiento de los estilos de aprendizaje (EA) de los estudiantes por parte de sus docentes. El objetivo es interpretar los EA en los estudiantes universitarios desde la percepción del docente. La metodología sigue el diseño hermenéutico desde un enfoque cualitativo, la técnica fue la entrevista, el instrumento fue la guía de entrevista semiestructurada, asimismo, se usó el Atlas ti; finalmente se identificaron distintas categorías emergentes.

Palabras clave: Educación a distancia, estilo de aprendizaje, enseñanza, estudiante universitario.

1. INTRODUCTION

Learning styles and their theories have undergone extensive development in recent years. Currently, teaching is not only based on the mastery of content by teachers, the assignment of tasks, among others, but also needs to know and understand how students learn and how to facilitate their learning. However, in order to better understand what learning styles are, one must first know the meaning of learning, which is defined as a process in which people receive information that is generated by experience. (Mendoza et al... 2022), 2022) Then, it can be said that the learning style is specific to each individual, this involves the way in which a student knows, observes and understands something new, in addition, this depends on age, motivation, self-learning, cognitive base, among others. (Roque et al. 2021) Based on the above, it should be taken into account that the teacher must be flexible, adapting his teaching to the diversity of learning that can be found. (Díaz-Serrano, et al., 2022).

Valverde-López and Ureña-Hernández (2021), argue that there are different teaching and learning styles, and that, in the same way, it should be understood that the means used by the teacher to easily transmit knowledge are called: teaching styles; and the process that occurs between the interaction of the subject and the way he/she learns are called: learning styles. For their part, Puiggalí and Tesouro (2021) consider that there are many definitions for AE, however, they indicate that it is a term used to refer to how students study and learn, also highlighting that learning styles enhance the predisposition of the student with respect to learning, and the way in which he/she does it.

Bou-Sospedra et al., (2021), state that AE are those indicators of how a person receives knowledge and interprets it in order to understand it; in other words, they are the student's preferred channel for capturing information, some students focus on details, while others focus on logical aspects, or in such a case some learn in groups, while others find it easier to learn individually. All this opens a range of possibilities for teachers to learn about the learning styles of their students and on this basis be able to offer quality teaching focused and personalized for each of them.

To understand learning styles, we must focus on the 4 predominant styles designed by Fleming and Milles (1992), the famous VARK (visual, auditory, reading-writing and kinesthetic), to recognize AE, based on the way in which concepts are used, interpretation of information, problem solving, among others. The aim was to help teachers adapt their classes to the different ways in which students learn in order to improve teaching and, in the same way, to personalize it. So, if we talk about the VARK model we have 4 styles, first, visual learning, this is the one where the student learns better when they can visualize the information to later remember it; second, auditory learning, in this style it can be understood that students learn better by listening to the information, processing it to finally understand and remember it; third, reader-writer learning, as its name suggests, students understand better by transcribing and reading the information; finally, kinesthetic learning, which is based on the student's preference for developing exercises to demonstrate what he/she should learn. Also, learning styles, show that a person has some preference to be able to capture, understand and learn new knowledge or some new information from their environment; in addition, it is important to indicate that no EA is better than the others, each one is independent of the person, although it is possible that an individual who has an EA can gradually change and modify their EA; this because in some careers it is important to handle several EA, as is the case of medicine, where not only the theoretical part is needed but also the practical and visual, which is related to what is indicated by Reyes, et al. (2017), who sustain that AE are the different ways in which students learn some subject; people learn differently relying on some experience or previous knowledge. For this reason, despite the fact that a class is explained to the same classroom, there will be some students who understood everything, a group that understood quickly and others with difficulties to understand it, and if they continue not understanding it, it will possibly lead these students to fail the course, to choose another career, to look for some unethical way to pass it, to change careers, to withdraw from the course or to drop out of their studies.

In the teaching-learning process it is necessary that the teacher knows the learning styles of his students, since each student learns differently, so the way in which a class is guided must be completely personalized creating a learning environment where didactic strategies are used to build learning in each student and promoting learning to learn. (Polo, et al., 2022).

In recent years, much research has been done regarding the acquisition of knowledge, this reflects a paradigm shift within the educational community, which is related to teachers, students, institutions, learning dynamics, and the products of the teaching-learning process. Today, one of the great challenges is virtuality, which has arrived to contribute to what was already known, including all the technology we have at our disposal and as teachers we must use them focusing on AE. (Filho, et al., 2021).

Mosquera-Gonzáles, et al., (2021) mentions that it is essential to implement ICTs in virtuality since they have many benefits that can facilitate and accelerate some processes at the time of learning. Students can have access to new tools, as well as the possibility of discovering how to obtain knowledge in a simpler way and without limitations, which is favorable since it is possible to recognize the different learning styles of each student.

1.1 Learning styles in virtual environments

As a result of the COVID 19 pandemic, the education sector was involved in this situation and institutions have been promoting the use of information and communication technologies (ICT), as well as the use of virtual environments to link both teachers and students in the teaching-learning process. In order to minimize class loss in students and as action plans in the search to transfer face-to-face teaching to virtual teaching, several educational institutions decided to hire videoconferencing services to teach classes, in addition, virtual environment platform licenses were acquired to support the organization in virtual teaching (Del Prete and Cabrero, 2020).

In Peru, the Ombudsman's Office (2020) recommended the supervision and monitoring of the remote education service and that it should clearly state the guidelines to govern virtual education. In some universities in Lima, which included the virtual delivery of classes, they did it in an improvised way, only prioritizing the contents, without changing the design of the class or its dynamics. In other words, class delivery has not changed with respect to the face-to-face class, and the students' AE has not been taken into consideration.

However, due to the pandemic, it was almost mandatory, the migration from face-to-face to virtual, which generated chaos,

however, many of the institutions were not prepared to offer this service. Despite this, the institutions decided to employ various digital strategies in each class to maintain motivation, interest and commitment on the part of students while maintaining educational quality. Although university teachers use ICTs to teach their classes, they do not focus on knowing the AE of their students, but rather on a generalized teaching, where the diverse ways of learning of students are not taken into account (Manzoor, et al., 2022). Given this situation, the problem of this research arises: How to interpret the AE of university level students in a technology-mediated education that favors teaching practice?

For the general objective, we sought to interpret the AE in university level students in an education mediated by technology from the perception of teachers, which contribute to the strengthening of their teaching practice; specifically, we had: to know the types of learning in virtuality; to understand the different ways of learning in virtuality; to classify the pace of learning according to the needs of the student in virtuality; to define the relevance of knowing the AE of the university student in virtuality and to identify the benefits of teaching according to the AE of the university student in virtuality.

2. METHODOLOGY

Since it is necessary to deepen knowledge, there is a basic study and, according to FONDECYT (2021), its objective is to increase the generation of new scientific knowledge by using experimental or theoretical works that seek to expose the bases of each phenomenon and observable fact. Its design is phenomenological, since it focuses on emphasizing the individual's experience and, as mentioned by Rangel-Flores, et al. (2022), it focuses on discovering, exploring, describing and understanding the way in which individuals relate their experiences about a given event. The method is hermeneutic, since it interprets the information gathered by the informants. The approach is qualitative, which according to Hernández-Sampieri and Mendoza (2018) establishes that data collection is done through semi-structured interviews and for the analysis of the data hermeneutics is used, in addition all this process must be rigorous to raise the level of validity and reliability.

Categories, Subcategories and categorization matrix.

TABLE 1 Categorization matrix

Base Category	Subcategories	Subcategories
Learning styles (LTS)	Type	Cognitive
		Affective
		Experiential

Base Category	Subcategories	Subcategories
	Virtual	Audiovisual
		Pragmatic
		Significant
	Rhythm	Learning activities
		Performing the activities
		Transfer what has been learned
	Relevance	Participation
		Motivation
		Teamwork
	Benefits	Strengthening of skills
		Behavior modification
		Easier achievement of objectives

Source: Prepared by the researchers

The category used was Learning Styles which is defined by Roque, et al. (2021) as the way in which a student knows, observes and understands something new, idea or information.

Study scenario

It was focused on state or private sector universities, seen and understood from the perception and analysis of Peruvian and foreign teachers from Cuba, Costa Rica and Spain, who have been applying methodological strategies based on the AE of their students in their respective virtual classes. This scenario was mediated through a digital platform known as Zoom, where the interviews were conducted.

Participants

There were 9 teachers from the university education sector, who are recognized by the Peruvian and foreign scientific community in relation to educational topics of AE. On the other hand, all of them meet the inclusion criteria of the present research and thus maintain academic rigor. The criteria applied for the inclusion of the expert participants correspond to (1) identifying the AE of the students in their classes, (2) using some methodology after knowing the AE of their students, (3) teaching their classes in public or private universities, (4) those who have had experience in teaching online or virtual classes because of Covid-19. The criteria used for exclusion were (1) teachers who are teaching in technical schools or at the initial, primary or secondary levels, (2) who only have experience in teaching face-to-face classes, (3) who do not know the AE of their students and (4) who are not proficient in ICT.

Data collection techniques and instruments

Given that the aim is to know the environment of each of the experts and the way in which their experiences can be known during a conversation (Conde-Cortabitarte et al., 2020), the technique applied was the interview. The instrument used corresponds to a semi-structured interview guide, which is based on data collection for which ordered questions were used, based on a question form directed to the unit of study.

Procedure

The semi-structured questions were elaborated taking as initial reference a consistent and contextual theoretical framework, in addition to the contributions of a specialist in educational issues and scientific methodology, who contributed to the academic rigor in the elaboration of the guide of semi-structured questions; in that sense, the questions were made with certain criteria such as clarity, relevance and precision, taking into account the current context of global health emergency. Subsequently, the informants were sought, who are university professors knowledgeable about the AE of their students and who are teaching virtual classes in Peru or abroad. To communicate with the informants, we used e-mail to request their support in the research through an interview; after their acceptance, we proceeded to set the schedules taking into account the time difference for foreign informants. Following the research guidelines established at the Universidad César Vallejo, letters of introduction were requested to be delivered to each of the expert professors who participated in the research, thus making the interviews official; then the letter of introduction, the link created in the Zoom platform for the meeting and the interview guide were sent through the institutional e-mail to each informant, with the purpose of collecting the most important information for each of the questions and maintaining a high level of fluency in the development of the interview.

In this regard, prior to the interviews, a presentation was prepared with the questions to be asked, which were used as support for the videoconference interviews. During the conversation with the informants, the guidelines set forth in the informed consent, which authorized the recording, were followed. In addition, the transcription of each recording was obtained automatically.

Academic rigor

Six criteria were identified that allow qualitative research to follow an appropriate path: 1) credibility, which relates the findings between research and reality; 2) contextualization, which relates the reality of the study environment and applicability; 3) validation and reliability,

which support that each of the findings are of a credible, transferable and confirmable character; 4) ethical practice, related to the transparency that begins with the collection of data until it is published; 5) rigor, which has to do with the systematic approach and the technique being reliable and valid for the research; 6) data analysis, in which the technique, the interpretation of the data obtained, analytical category, theme and conclusions are involved. Each of the above criteria was scrupulously followed to achieve a concrete study that contributes acceptably to the scientific community.

In a qualitative research, scientific rigor is related to the environment on which it is developed; also, it must follow the research guidelines of Peru and the Universidad César Vallejo. In addition, scientific rigor is a characteristic that researchers must know and is related to the use of correct reasoning in the development and elaboration of some research writing. (Soler and Jiménez, 2012) Qualitative research is related to the naturalistic paradigm, which is based on credibility, since the data collected from the interviews are representative; transferability, since it is possible to extend the results applied in a different context; impartiality, since the researcher must carry out each process leaving some lack of ethics; confirmability, which refers to the veracity in the collection of information and its analysis.

Data analysis method

With the support of Atlas ti, the triangulation process was carried out between the information gathered by the informants, the theoretical framework and the researcher's knowledge, for which they were coded, taking into account the categories and subcategories of the AE's, in addition, the ideas, concepts or similar themes identified were taken into account. Then, the most relevant terms related to each of the objectives were identified, and the hermeneutic method was used, which allows interpretation and understanding within the investigated context.

Ethical aspects

This work respected each one of the ethical aspects in order to ensure that it is in line with the reality and the context investigated. Each ethical principle and value was taken into account, avoiding making judgments before or after the study, each interview and in the synthesis of each result; it is important that the research fulfills the main goal of solving inconveniences, without breaking the value, morality and principle of the individual. In addition, each interview was authorized to be recorded, given that the experts gave their approval to the informed consent.

3. RESULTS AND DISCUSSION

After applying the semi-structured interviews conducted with the nine experts, we proceeded to interpret the experiences of the experts in university education in virtual environments about the AE of their students; next, we described the responses obtained according to each specific objective of this research, after performing the corresponding triangulation.

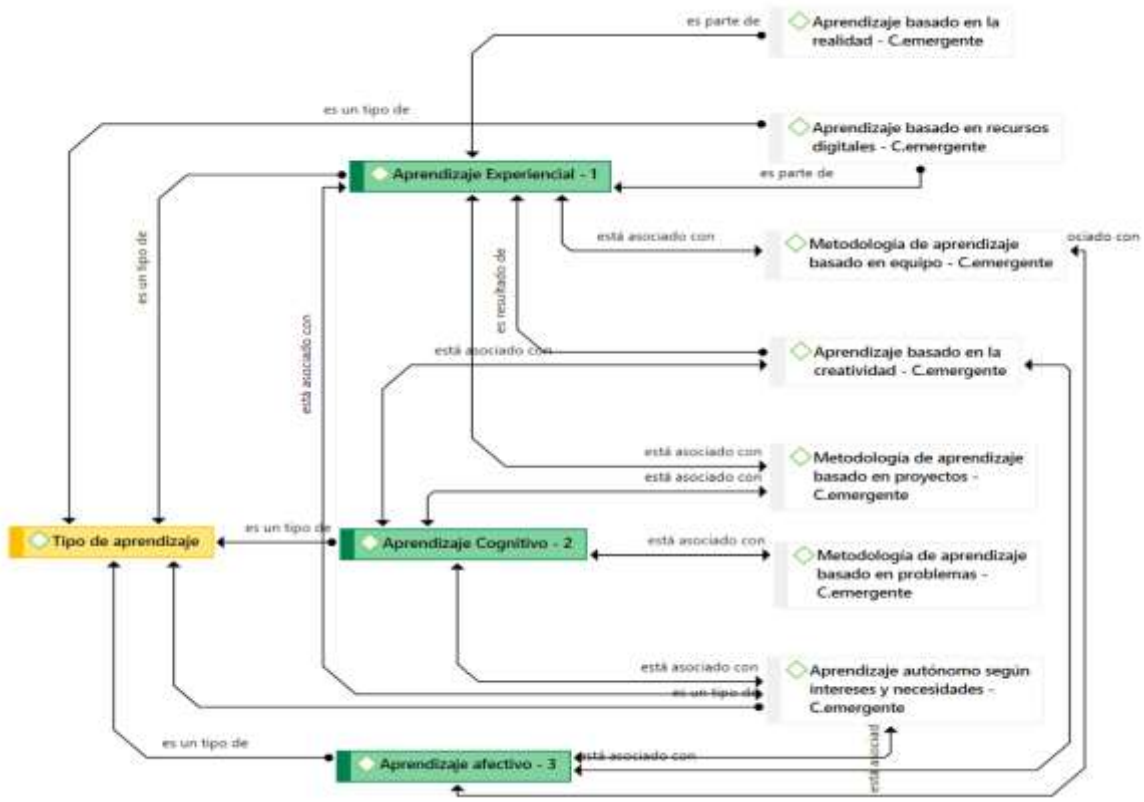
Objective 1: To know the types of student learning in the virtual world.

Figure 1: Word cloud resulting from the triangulation of the first target

Source: Prepared by the researchers

The most salient words obtained from the triangulation of the theoretical framework, the expert interviews and the researchers' knowledge about the first objective are shown. Then, hermeneutics was used as a technique for the interpretation and analysis of information, which is shown in Figure 2, which evidences the existence of the a priori categories, i.e. that were identified before the data collection process, and the appearance of the emerging categories, which emerged after the in-depth study and thorough analysis of the information.

Figure 2: Network of aprioristic and emergent categories of the first objective



Source: Prepared by the researchers

The researchers a priori determined that the types of learning were linked to three important theoretical constructs called subcategories, which are experiential learning, cognitive learning and affective learning. Thus, in light of the evidence, not only these three subcategories should have been considered, but also reality-based learning (RBL), digital resources, creativity (ABC), autonomous learning according to interests and needs, as well as team-based, problem-based (PBL) and project-based learning (PBL) (García-Segura, et al., 2023). Thus, these seven new emerging subcategories allow improving and updating the current theoretical concept in which the types of student learning in a technology-mediated education in this state of global health emergency are being shown. After an in-depth analysis, it was determined that the emerging category ABR is a type of experiential learning; the emerging category of learning based on digital resources is a type of learning and in turn is part of experiential learning; the emerging category of the team-based learning methodology is associated with both experiential and affective learning; the emerging category of ABC is the result of experiential learning is associated with both cognitive and affective learning; the emerging category of PBL methodology is associated with both experiential and cognitive learning; the emerging category of PBL methodology is associated with cognitive learning; the emerging category of autonomous learning according to interests and needs is

a type of learning that is associated with both experiential and cognitive learning.

The concept of experiential learning starts from the previous knowledge or experiences and then with the use of new schemes and technological innovations generate in a fluid way the union with the new and unknown knowledge (Elizalde, et al., 2021); however, it is not taken into account that currently these experiences are related to the representation or simulations of reality and not necessarily participating in them directly, which allows the student to learn using these virtual experiences, and this type of learning is the ABR; and on the other hand, in this technology-mediated education, for a student to search, organize, create, communicate, share and collaborate with their classmates it is necessary to know their personal learning environment related to ICT, which is the type of learning based on digital resources. Likewise, cognitive type learning intervenes during development, it starts from the input of the senses until reaching the response, it is that learning that involves all the senses over time, it teaches you to expand the potential that our brain has (Saarinen, et al., 2021); however, it was not taken into account that nowadays it is necessary that this learning is verified by presenting students with challenges, solution alternatives to a contextualized situation or that integrates the topics worked on in one or several subjects, which would allow them to develop their capabilities and competencies, then this is how PBL is presented. Additionally, about each antecedent found for this study, affective learning was defined as an emerging model, Melo-Solarte and Díaz, (2018) state that emotion is a modulator and stabilizer of the learning processes, also sustains that it is a dimension of the human so we can learn by being influenced by what we feel.

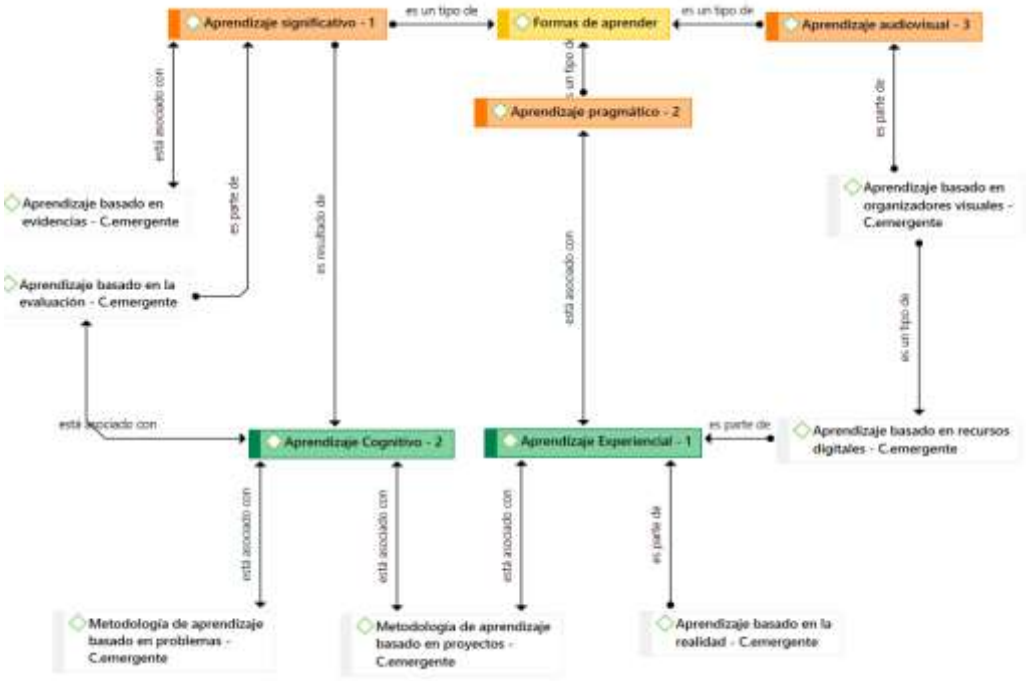
Objective 2: To understand the different ways of learning of students in the virtual world.

Figure 3 shows the most salient words obtained from the triangulation of the theoretical framework, the expert interviews and the researchers' knowledge of how university students learn. Then, hermeneutics was performed to interpret and analyze the information, which is shown in Figure 4, which evidences the existence of the aprioristic categories and the appearance of the emergent categories.

Figure 3: Word cloud resulting from the triangulation of the second objective.

Source: Prepared by the researchers

Figure 4: Network of aprioristic and emergent categories of the second objective



Source: Prepared by the researchers

The researchers a priori determined that students' ways of learning were linked to three important theoretical constructs called subcategories, which are meaningful, pragmatic and audiovisual learning. Thus, in light of the evidence, not only these three subcategories should have been considered, but also evidence-based learning, assessment, visual organizers, cognitive learning, experiential learning, ABR, learning based on digital resources, as well as PBL and PBL methodology. In this way, these nine new emerging subcategories allow to improve and update the current theoretical

concept in which the ways of learning of students in a technology-mediated education in this state of global health emergency are being shown. After conducting an in-depth analysis, it was determined that the emerging category evidence-based learning is associated with meaningful learning; the emerging category of assessment-based learning is part of meaningful learning and in turn is associated with cognitive learning; then, meaningful learning is a result of the category of cognitive learning, which is associated with two emerging categories that are PBL methodology and PBL methodology; pragmatic learning is associated with experiential learning, and both the emerging categories of ABR and learning based on digital resources are part of experiential learning; the emerging category of learning based on visual organizers is part of audiovisual learning, and in turn is a type of learning based on digital resources.

Regarding the concept of meaningful learning, Díaz-López (2021) mentions that this is based on involving students in the process to encourage the management of their soft skills, likewise, this learning refers to using the student's previous knowledge to create a new one. On the other hand, regarding pragmatic learning Rodriguez, et al (2015) mentions us that this learning is based on active experimentation, it seeks to practically apply a new idea, it can be understood that this learning is associated with previous experience. And finally, audiovisual learning was defined as the construction of mental representations from a multimedia type presentation that allows students to build their own knowledge (Rodriguez-Almagro et al., 2021); and indeed, to be able to do so in this technology-mediated education it is necessary to rely on digital tools and make these representations, which must be clear and easy to understand in order to remember the information placed, in that sense it is necessary learning based on visual organizers, among which infographics, mind maps, semantic tables, which can even be animated, include audio and video for better support to remember the information placed in them.

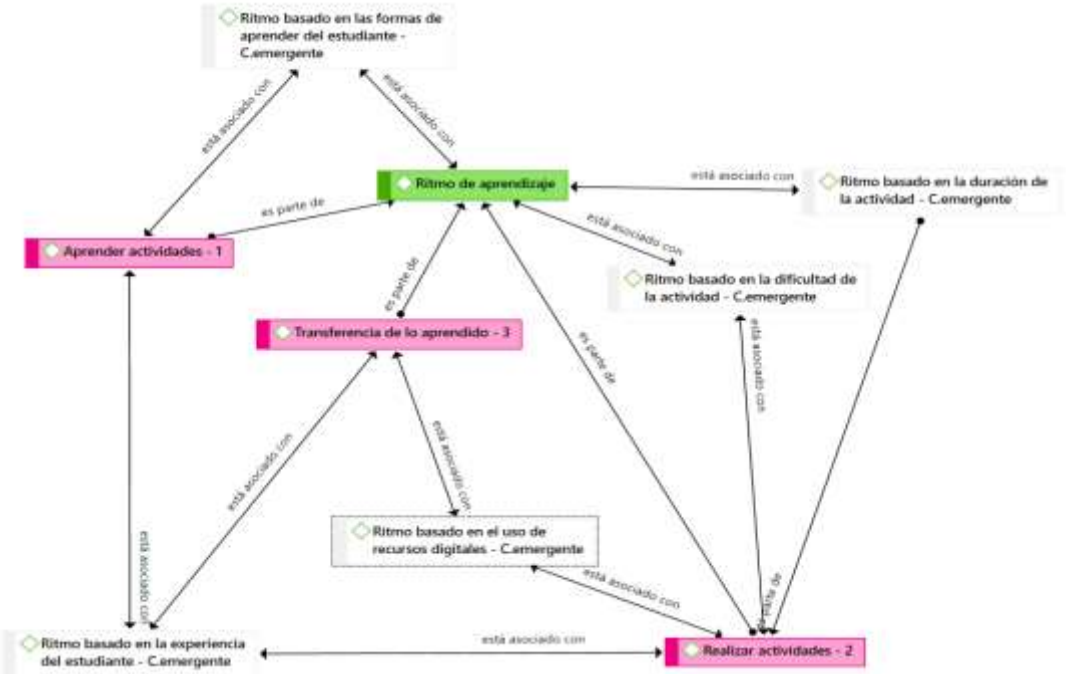
Objective 3: Classify learning rhythms according to the needs of students in the virtual world.

Figure 5: Word cloud resulting from the triangulation of the third objective

Source: Prepared by the researchers

Figure 5 shows the most salient words obtained from the triangulation of the theoretical framework, the interviews with the experts and the researchers' knowledge about classifying the learning rhythms according to the needs of university students. Then, hermeneutics was performed in the interpretation and analysis of the information, which is shown in Figure 6, which evidences the existence of the aprioristic categories and the appearance of the emergent categories.

Figure 6: Network of aprioristic and emergent categories of the third objective



Source: Prepared by the researchers

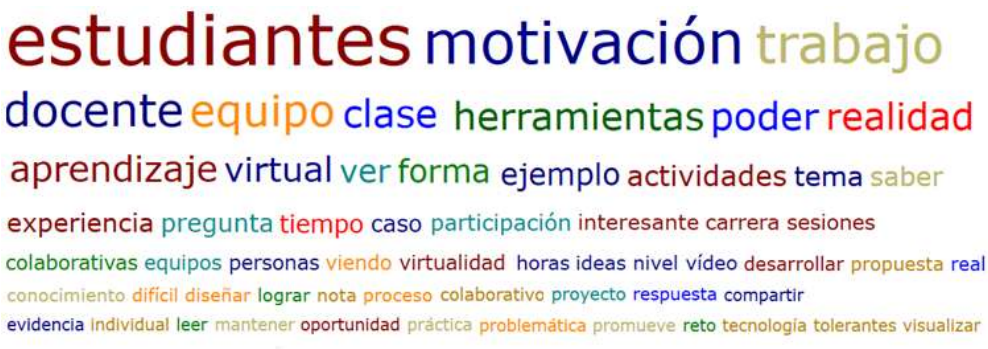
The researchers a priori determined that learning rhythms could be classified taking into account their linkage with three important

theoretical constructs called subcategories, which are learning activities, doing activities and transferring what has been learned. Thus, in light of the evidence, not only these three subcategories should have been considered, but also the pace based on the student's ways of learning, the pace based on the duration of the activity, the pace based on the difficulty of the activity, the use of digital resources and the student's experience. In this way, these five new emerging subcategories allow improving and updating the current theoretical concept, which has been showing the learning rhythms of students in a technology-mediated education in that state of global health emergency. After conducting an in-depth analysis, it was determined that the emergent category rhythm based on the student's ways of learning is associated with both learning and the pace of learning; the emergent category of the rhythm based on the duration of the activity is associated with the pace of learning and in turn is part of the performance of the activities; the emerging category of pace based on the difficulty of the activity is associated with both the pace of learning and the completion of activities; the emerging category of pace based on the use of digital resources is associated with both the completion of activities and the transfer of learning; and the emerging category of pace based on student experience is associated with both the learning of activities, the completion of activities, and the transfer of learning.

Carrying out the activities encourages interactivity and student self-learning, and it should be sought to combine teaching with activities during class and outside it (García et al., 2020); in that sense it has been missing to consider that this technology-mediated education is necessary that these activities take into account the different ways in which the student learns and should also take into account the students' previous knowledge or knowledge. Likewise, regarding the concept of transfer of what has been learned, it indicates that it is a process of mental activity where past experiences influence the performance when facing a new one; in addition, it is evidence of understanding and cognitive thinking of higher order and in effect takes into account the learning based on the student's experience, but it should be added that, in this technology-mediated education it is necessary that students have mastery of technological tools and for this it is necessary a learning based on digital tools. (Marta-Lazo, et al., 2021).

Objective 4: To define the relevance of knowing the AE's in university students in virtuality.

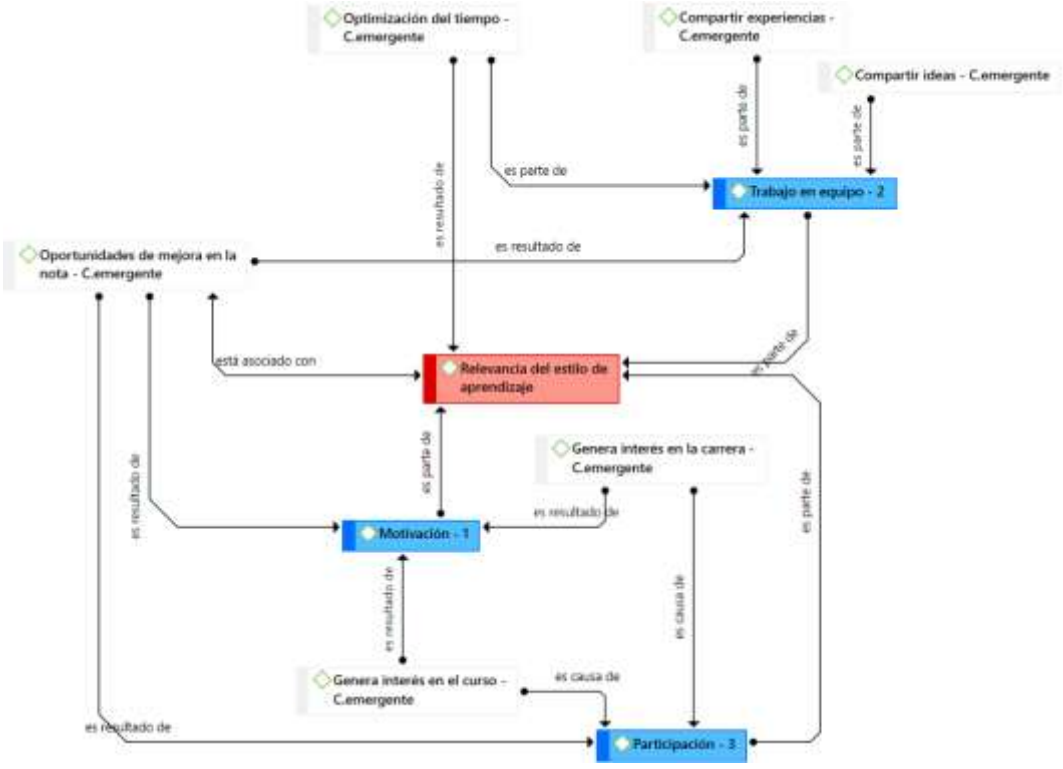
Figure 7: List of words resulting from the triangulation of the fourth objective



Source: Prepared by the researchers

Figure 7 shows the most salient words obtained from the triangulation of the theoretical framework, the interviews with the experts and the researchers' knowledge about the relevance of knowing AE in university students in virtuality. Then, the corresponding hermeneutics was performed, the product of which is shown below:

Figure 8: Network of aprioristic and emergent categories of the fourth objective



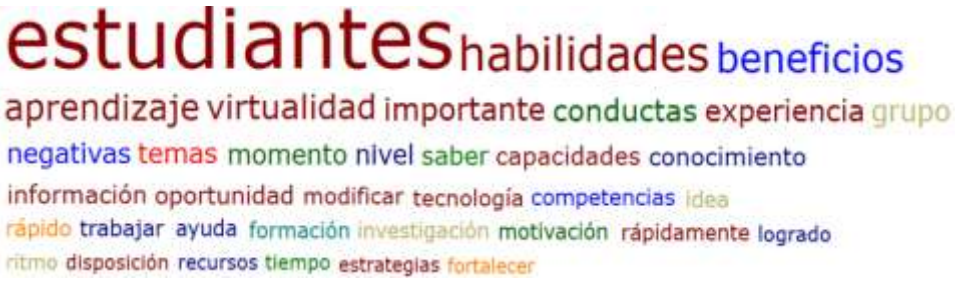
Source: Prepared by the researchers

The researchers a priori determined that the relevance of learning style could be classified taking into account its linkage with three important theoretical constructs called subcategories, which are motivation, teamwork and participation. Thus, given the evidence, not only these three subcategories should have been considered, but also opportunities for improvement in grading, time optimization, sharing experiences, sharing ideas, and generating interest in the course should have been taken into consideration. Thus, these five new emerging subcategories allow improving and updating the current theoretical concept in which the relevance of students' AE in a technology-mediated education in this state of global health emergency is being shown. After performing a deep analysis, it was determined that the emerging category opportunities for improvement in the grade is associated with the relevance of the learning style, and at the same time is a result of both motivation and participation; the emerging category of time optimization is a result of the relevance of the learning style and is part of teamwork; the emergent category of sharing teamwork experiences; the emergent category of sharing teamwork ideas; the emergent category of generating interest in the course is a result of motivation and, at the same time, is a cause of participation; the emergent category of generating interest in the course is a result of motivation and, at the same time, is a cause of participation.

For Flores-Fernández and Durán (2022) the interaction of students is fundamental so that participation is characterized by being spontaneous or voluntary during class, in this sense it has failed to consider that allows students to share their experiences and ideas, in addition, in this technology-mediated education it is necessary that students understand the reasons why the development of each of the subjects of their curriculum is important and thus seeks to generate interest, both in the course and the career they are pursuing. Also, motivation is the engine of human behavior, in this case of students, (Corrales-Perea and Espada, 2022) for this point has failed to indicate that this virtual education students want to get passing grades in their courses, and adequate motivation from teachers, using various methodologies, allows students to not only maintain these grades, but also have the possibility of improving them. With respect to teamwork, this allows to unify the student's team activity to achieve a joint objective. Thus, in this technology-mediated education, it should be taken into account that students want to share their ideas and experiences when they are in a group, but for this to happen it is necessary that the teacher considers adequate and sufficient time for an adequate exchange or discussion. (Ruíz-Campo, et al., 2022).

Objective 5: To identify the benefits of teaching according to the AE's of university students in virtuality.

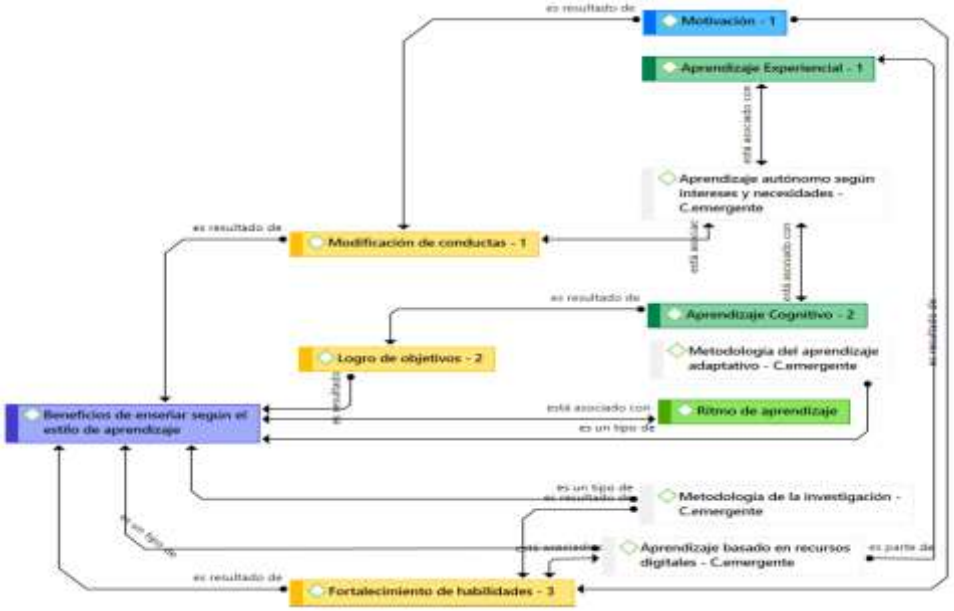
Figure 9: List of words resulting from the triangulation of the fifth objective



Source: Prepared by the researchers

Figure 9 shows the most salient words obtained from the triangulation of the theoretical framework, the interviews with the experts and the researchers' knowledge about the relevance of knowing the AE in university students in virtuality. Then, hermeneutics was performed, the product of which is shown in Figure 10, which evidences the existence of the a priori categories, that is, those that were identified before the data collection process, and the appearance of the emerging categories, which emerged after the deepening and thorough analysis of the information.

Figure 10: Network of aprioristic and emergent categories of the fifth objective



Source: Prepared by the researchers

The researchers a priori determined that the benefits of teaching according to the students' AE could be classified taking into account

their linkage with three important theoretical constructs called subcategories, which are behavior modification, achievement of objectives and strengthening of skills. Thus, in light of the evidence, not only these three subcategories should have been considered, but also motivation, experiential learning, autonomous learning according to interests and needs, cognitive learning, adaptive learning methodology, learning pace, research methodology and learning based on digital resources. Thus, these eight new emerging subcategories allow improving and updating the current theoretical concept in which the benefits of teaching according to the EAs of university students in virtuality have been shown. After conducting an in-depth analysis, it was determined that the emerging category motivation is the result of the modification of behaviors and in turn is the result of the strengthening of skills; the emerging category of autonomous learning according to interests and needs is associated both with the category of experiential learning, the category of cognitive learning and the modification of behaviors; the category of cognitive learning is the result of the achievement of objectives; the adaptive learning methodology emergent category is a type of benefit of teaching according to learning style; the learning pace category is associated with a benefit of teaching according to learning style; the research methodology category is both a type of benefit of teaching according to learning style and a result of skill enhancement; the digital resource-based learning category is associated with skill enhancement and is part of experiential learning.

Students learn when they acquire the ability to do something in a different way or when they apply some learning technique that allows them to improve their behavior (Corsi, et al., 2009), this is called behavior modification, which must be complemented taking into account the interests and needs of each student, in addition, this behavior modification generates motivation in students during the virtual classes. On the other hand, it is indicated that virtual learning has changed the strengthening of knowledge and information making use of intelligent systems; in addition, it has allowed the development of organizational skills, understanding of new concepts, and improvement of language (Aguilar, 2020); which is shared with the findings because students learn based on digital resources, however, this strengthening, in this technology-mediated education, allows in them the interest in the search for information, research, allowing in them the relationship with previous experiences and finally generates that they feel motivated.

4. CONCLUSIONS

In conclusion, the types of learning present in this technology-mediated education should pay attention to autonomous learning, reality-based learning, creativity and digital resources; which are directly associated with the interests, needs and experiences of the student, because, to generate the desire to learn it is important to know how to maintain these aspects; in addition, it should be complemented by applying different methodologies such as PBL and PBL. It is suggested to encourage teachers to recognize the AE of their students so that they take into account the different way of learning of each one, which depends on the career or level of studies they are pursuing at the university. Thus, it is recommended that university directors implement workshops so that university education teachers can recognize the different AE's of their students in the courses they will be teaching and take them into account when teaching their class sessions in virtual environments. It should be taken into account that teachers have not been prepared to work recognizing the types of learning of their students and this should be implemented to achieve the quality education that is sought.

REFERENCES

Aguilar, F. (2020). From face-to-face learning to virtual learning in pandemic times (Valdivia), 46(3), 213–223. https://doi.org/10.4067/S0718-07052020000300213

Bou-Sospedra, C., González-Serrano, M. y Jiménez, M.A. (2021) Study of teaching-learning styles from the perspective of the three educational agents: Students, teachers and families. Retos, (39), pp. 330-337. https://doi.org/10.47197/retos.v0i39.78798

Conde-Cortabitarte, I., Rodríguez-Hoyos, C., y Calvo-Salvador, A. (2020). Potencialidades y límites educativos de los videojuegos activos: una investigación basada en entrevistas a docentes de Educación Física. Cultura, ciencia y deporte, 15(43), 43-52.

Corrales-Perea, Á. y Espada, M. (2022) Motivación y percepción del alumnado en los estilos de enseñanza mando directo y resolución de problemas en educación física. Revista Electronica Educare, 26 (3), https://doi.org/10.15359/ree.26-3.2

Corsi, E., Barrera, P., Flores, C., Perivancich, X. y Guerra, C. (2009) Effects of a combined program of behavior modification techniques for decreasing disruptive behavior and increasing prosocial behavior in chilean school children. Acta Colombiana de Psicologia, 12 (1), pp. 67-76.

Defensoría del Pueblo. (2020). La Educación frente a la emergencia sanitaria. En Serie de informes especiales. https://www.defensoria.gob.pe/wp-content/uploads/2020/08/Serie-Informes-Especiales-No-027-2020-DP-La-educación-frente-a-la-emergencia-sanitaria.pdf.

Del Prete, A., y Cabero, J. (2020). El uso del Ambiente Virtual de Aprendizaje entre el profesorado de educación superior: un análisis de género. Revista de Educación a Distancia (RED), 20(62). https://doi.org/10.6018/red.400061

Díaz-López, M. (2021) Meaningful learning about biosafety through interactive infographics. Revista Cubana de Educacion Medica Superior, 35 (2), art. no. e2736.

Díaz-Serrano, J., Alfageme-Gónzalez, M. y Cutanda-López, M. (2022) Interaction of academic performance with learning and teaching styles. Revista Electronica Interuniversitaria de Formacion del Profesorado, 25 (1), pp. 145-160. https://doi.org/10.6018/reifop.486081

Elizalde, C., Estrella, P., Garcés, E. y Huerta, A. (2021) The ability to understand and the textual typologies in the primary basic education, third grade. Universidad y Sociedad, 13 (6), pp. 619-628.

Filho, M., Costa De Souza, J., Edson-Chaves, B. y Maia, L. (2021) Learning styles of students from a licentiate degree course in biological sciences in the city of Fortaleza – CE. Meta: Avaliacao, 13 (38), pp. 52-80. https://doi.org/10.22347/2175-2753V13I38.2974

Fleming, N., y Milles, C. (1992). Not another inventory, rather a catalyst for reflection. To Improve the Academy, 11(1), 137–144.

Flores-Fernández, C. y Durán, A. (2022) Active participation in classes: Factors that intervene in the interaction of students in synchronous online classes. Informacion, Cultura y Sociedad, (46), pp. 129-142. https://doi.org/10.34096/ics.i46.11069

FONDECYT. (2021). Proyectos de Investigación Básica 2021-01. https://www.fondecyt.gob.pe/convocatorias/investigacion-cientifica/proyectos-de-investigacion-basica-2021-01

García, M., Eguia, I., Etxeberria, P., y Alberdi, E. (2020). Implementation and assessment of interdisciplinary activities through dynamic applets for the study of geometry. Formacion Universitaria, 13(1), 63–70. https://doi.org/10.4067/S0718-50062020000100063

García-Segura, T., Montalbán-Domingo, L., Sanz-Benlloch, A., Domingo, A., Catalá, J. y Pellicer, E. (2023) Enhancing a Comprehensive View of the Infrastructure Life Cycle through Project-Based Learning. Journal of Civil Engineering Education, 149 (1), art. no. 05022002, https://doi.org/10.1061/(ASCE)EI.2643-9115.0000072

Hernández-Sampieri, R. y Mendoza, C (2018). Metodología de la investigación. Las rutas cuantitativa, cualitativa y mixta, Ciudad de México, México: Editorial Mc Graw Hill Education, Año de edición: 2018, ISBN: 978-1-4562-6096-5, 714 p.

Manzoor, R., Mohd-Isa, N. y Dollmat, S. (2022) Post-pandemic e-learning: A pre-protocol to assess the impact of mobile VR on learner motivation

and engagement for VARK learning styles. F1000Research, 10, art. no. 1106, https://doi.org/10.12688/f1000research.73311.2

Marta-Lazo, C., Gabelas-Barroso, J., Nogales-Bocio, A. y Badillo-Mendoza, M. (2022) Multimedia learning and knowledge transfer on a digital platform. Entremedios case study. RIED-Revista Iberoamericana de Educacion a Distancia, 25 (1), pp. 101-120.

Melo-Solarte, D. y Díaz, P. (2018) Emotional learning and gamification in virtual education environments. Informacion Tecnologica, 29 (3), pp. 237-248.

Mendoza, M., León, P., Gilar, R., y Vizcaíno, M. (2022). Gestión del proceso enseñanza-aprendizaje: estilos de aprendizaje y rendimiento académico. Revista Venezolana de Gerencia, 27(Especial 7), 281-296. https://doi.org/10.52080/rvgluz.27.7.19

Mosquera-González, D., Valencia-Arias, A., Benjumea-Arias, M. y Palacios-Moya, L. (2021). Factores asociados al uso de tecnologías de la información y la comunicación (TIC) en los procesos de aprendizaje de estudiantes de ingeniería. Formación Universitaria, 14 (2), pp. 121-132. https://doi.org/10.4067/S0718-50062021000200121

Polo, R., Hinojosa, A., Weepiu, L., y Rodríguez, L. (2022). Estilos de aprendizaje y rendimiento académico en el área de comunicación con enfoque de sistemas. Revista de Ciencias Sociales (Ve), XXVIII (Especial 5), 48-62. https://doi.org/10.31876/rcs.v28i.38144

Puiggalí, J. y Tesouro, M. (2021) Influence of contextual variables on the teaching approach: Relationship between teaching approach and learning style. Aula Abierta, 50 (1), pp. 481-489. https://doi.org/10.17811/RIFIE.50.1.2021.481-490

Rangel-Flores, Y., Rincón-Zúñiga, T. y Hernández-Ibarra, L. (2022) The lived experience of the obstetric emergency: a phenomenological study with Mexican women. Saude e Sociedade, 31 (1), art. no. e180010, https://doi.org/10.1590/S0104-12902022180010

Reyes, A., Ballagas, P., Machín, V. y Morejón, Y. (2017) Experience in adapting activities to the learning styles of postgraduate distance learning. Cubana de Educacion Medica Superior, 31 (2), 14 p.

Rodríguez-Almagro, J., Prado-Laguna, M., Hernández-Martínez, A., Monzón-Ferrer, A., Muñoz-Camargo, J., y Martín-Lopez, M. (2021). The impact on nursing students of creating audiovisual material through digital storytelling as a teaching method. International Journal of Environmental Research and Public Health, 18(2), 1–10. https://doi.org/10.3390/ijerph18020694

Rodríguez, H., Limón, J., Pisfil, M., Torres, D. y Exume, J. (2015) Estilos de aprendizaje: un estudio diagnóstico en el centro universitario de ciencias económico-administrativas de la U de G. Revista de la Educacion Superior, 44 (175), pp. 121-140. https://doi.org/10.1016/j.resu.2015.09.005

Roque, Y., Cañas, M., Alonso, S., y Curay, C. (2021). Estilos de aprendizaje y metas de logro en estudiantes universitarios durante la pandemia de COVID-19. Texto Livre: Linguagem e Tecnologia, 14(2), 1–11. https://doi.org/10.35699/1983-3652.2021.33988

Saarinen, A.., Lipsanen, J., Hintsanen, M., Huotilainen, M. y Keltikangas-Järvinen, L. (2021) The use of digital technologies at school and cognitive learning outcomes: A population-based study in Finland. International Journal of Educational Psychology, 10 (1), pp. 1-26. https://doi.org/10.17583/IJEP.2021.4667

Soler, P. y Jiménez, A. (2012) Essay about scientific rigor in qualitative research. Estudios Sobre el Mensaje Periodistico, 18 (SPEC. NOVEMBER), pp. 879-888. https://doi.org/10.5209/rev_ESMP.2012.v18.40966

Valverde-López, L. y Ureña-Hernández, M. (2021) A proposal of didactic strategies and resources by competencies in response to teaching-learning styles of the student population. Revista Electronica Educare, 25 (3), https://doi.org/10.15359/ree.25-3.7