REPIQUE REVISTA DE CIENCIAS SOCIALES
e-ISSN: 2550-6676

Vol. 7 No. 1
January - June 2025
e-ISSN: 2550-6676
pp 94-113

Personalized learning environment (PLE) for Biology using Symbaloo Lesson Plans as a digital resource

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Abstract

This study investigates the analysis and implementation of the Personal Learning Environment (PLE) in the teaching of Biology at the Angel Modesto Paredes Educational Unit. Within the main objective of the research, the ability to use digital tools such as Symbaloo lesson plans to generate PLE, in order to improve the academic performance of students in the subject of Biology, Natural Sciences Area, and to promote the use of ICT in the teaching-learning process was examined. Since a descriptive approach was used to determine the use of PLE with traditional teaching, to adapt to the demands of the current educational environment; it was found that the performance of students in Biology was unfavorable, which prompted the adoption of digital strategies that encourage active and personalized learning. This work aims to change current teaching methods so that teachers can use ICT to enrich teaching and respond to the needs of today's society, providing dynamic learning that is better adapted to the individual needs of students.

Keywords: Educational technology, computer-assisted instruction, academic achievement, active learning, educational informatics.

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How to cite APA: Mejia, J. (2025) Personalized learning environment (PLE) for Biology using Symbaloo Lesson Plans as a digital resource. *Repique*, 7(1), 94-113

Entorno de aprendizaje personalizado (PLE) para Biología utilizando los planes de lecciones de Symbaloo como recurso digital

Resumen

Este estudio investiga el análisis y la implementación del Entorno Personal de Aprendizaje (PLE) en la enseñanza de Biología en la Unidad Educativa Ángel Modesto Paredes. Dentro del objetivo principal de la investigación, se examinó la capacidad de utilizar herramientas digitales como los planes de lecciones de Symbaloo para generar PLE, con el fin de mejorar el rendimiento académico de los estudiantes en la asignatura de Biología, Área de Ciencias Naturales, y promover el uso de las TIC en el proceso de enseñanza-aprendizaje. Dado que se utilizó un enfoque descriptivo para determinar el uso de PLE con la enseñanza tradicional, para adaptarse a las exigencias del entorno educativo actual; se encontró que el rendimiento de los estudiantes en Biología era desfavorable, lo que impulsó la adopción de estrategias digitales que fomentan el aprendizaje activo y personalizado. Este trabajo tiene como objetivo cambiar los métodos de enseñanza actuales para que los profesores puedan utilizar las TIC para enriquecer la enseñanza y responder a las necesidades de la sociedad actual, proporcionando un aprendizaje dinámico que se adapte mejor a las necesidades individuales de los estudiantes.
Palabras clave: Tecnología educativa, enseñanza asistida por ordenador, rendimiento académico, aprendizaje activo, informática educativa.

Received : 12-04-2024
Approved: 13-05-2024

INTRODUCTION

In secondary education, the teaching of the subject of Biology in the area of Natural Sciences is affected by different challenges, such as the little importance that students give to this subject, the lack of motivation, the little use of support materials/resources, the scarce implementation of active methodologies, among others.

The research, carried out since 2019-2020, is focused on the specialty of Techno-pedagogical Design and has been elaborated with the objective of integrating ICT for teaching in the area of Natural Sciences. It is aimed at 2nd year high school students of the Unidad Educativa Ángel Modesto Paredes, in the city of Quito, to address the following problem: it has been identified that some students, for various factors, do not understand the topics as well as their peers and this, in turn, affects the evaluations and academic performance of each of them.

With this background, it has been decided to carry out this project in which it is argued that the use of new active learning methodologies, supported by the use of ICT, benefit both students and teachers, as they are part of the teaching-learning process. These methodologies are directed to the use of the PLE in such a way that the traditional pedagogical models of teaching can be transformed into innovative models, through the integration of digital tools, both inside and outside the classroom.

understand the PLE as the "set of tools, information sources, connections and activities that each person uses on a regular basis to learn" (p.7). Such was its emergence that, in the Horizon Report, , it was presented as a technology that had an impact on university environments both in its implementation and in the results obtained. Therefore, the Lesson Plans of Symbaloo is proposed as a digital resource, since this PLE is based on student-centered learning and, as mentioned by some authors, PLEs bring good

results in the educational process and, through them, a new approach to the methodologies that can be applied to capture the interest of students can be achieved. Likewise, explains that PLEs make it possible to manage their formal and informal learning more effectively.

In addition, it is about promoting the use of the FLIPPED CLASSROOM as an active methodology which takes full advantage of the use of the PLE. This will allow the student to set the learning objectives and advance at a pace that allows him/her not only to continue, but to learn. points out that the *flipped classroom* model emerges in different educational environments and levels with great force to recover the student as the protagonist of the learning process.

According to , students are responsible for their learning through the use of the materials made available to them online. All this represents a change of roles in education, thus generating collaborative participation between teacher and student to generate the learning that students need to achieve the learning objectives.

With respect to the data that support the execution of the study, some experiences are mentioned that make evident the adequate use of PLE to motivate student participation during the teaching-learning process:

do not explain their experience based on the creation of an educational blog in the subject of "ICT applied to Education" in the 1st year of the Degree of Teacher in Primary Education, at the University of Burgos, during the 2010/2011 academic year, where the work they did could contribute to co-constructivist learning, since students could, in addition to making their own blog to show the work done, rate the work of their classmates, thus improving their capacity for reflection and analysis, and, therefore, their learning, which was reflected in the grades obtained.

designed a PLE to work on the unit dedicated to Integers with sixth grade students; for this purpose, they developed a **Symbaloo webmix**, so that the student could get information, build, participate, collaborate and find digital materials for learning. Among the results obtained from its application, it is mentioned that the students were able to learn the contents related to the area of mathematics.

In the area of Language and Literature, a social network called Tecnomac 1 was created, in which students create their own account and publish their stories, as well as vote for five stories from among those of their classmates. In addition, a forum was opened in which students should participate in topics related to the activity carried out. Among the results obtained, it is mentioned that, with respect to the participation in the forum, there was not an adequate number of student participation, while, with the publication of the story, only 50% were able to complete the activity; concluding that, for being the first time that PLE is integrated in the classroom, it is considered that the result obtained was good.

Taking into account the experiences mentioned in the present research, the teaching innovation experiences presented above and the different Personal Learning Environments that exist, it is considered that these provide the adequate foundation to carry out the project with the expectation of obtaining excellent results during its implementation.

Context of action

The present research was carried out during the years 2019 and 2020, in the Angel Modesto Paredes Educational Unit, which is located in District No. 6 of the province of Pichincha, city of Quito, parish Chilibulo, neighborhood Los Libertadores; main street

Zaruma S10-344 and Jose Eguzquiza. The information of the center is indicated below:

Table 1: *Educational Center Data.*

ADDRESS: Zaruma S10-344 y José Egusquiza		AMIE CODE: 17H0053	PHONE: 02 2665-211
PROVINCE:	**CANTON:**		**PARISH:**
Pichincha	Quito		La Magdalena
WEBSITE:	https://lcdojorgeluismejia.wixsite.com/uefamp https://www.facebook.com/ueamp		
E-MAIL:	17h00553amp@hotmail.com		
SUSTAINMENT:	**REGIME:**		**MODALITY:**
Prosecutor	Sierra		On-site
CURRICULAR LEVELS	**SUB-LEVELS**	**DISTRICT**	**CIRCUIT**
• Initial Education • General Basic Education • General Unified Baccalaureate	• Sublevel 1and2, high school • Basic Elementary • Middle School • Basic Superior • Baccalaureate	17H0D6 Eloy Alfaro	01-10
DAYS:	**WORKING HOURS:**		
Morning - Evening	07H00 - 13H00	13H10 - 19H00	

Source: Angel Modesto Paredes Educational Unit

Needs analysis

During the investigation, the authorities of the educational center were interviewed, and they were able to provide the necessary information regarding what could be the needs that are currently present and have not been solved. Therefore, it was detected that, with respect to high school students, the learning results obtained in the different subjects have been satisfactory and in some cases most of them have passed with the minimum grade.

For this reason, the topic was deepened and the problem to be addressed was defined, which is based on the low academic performance of students and we proceeded to analyze the results of the SER BACHILLER tests, which assesses the progress of the competencies and skills that students must obtain at the end of intermediate education and that are necessary for the successful development as citizens and to access higher education studies, since most of the topics that are evaluated correspond to the 2nd year of high school. The qualification of this test corresponds to 30% of the final grade of the baccalaureate and is a fundamental requirement for graduation, in addition, with the same result they enter the admission process in higher education. Marlene Teresa Jimenez Riera, RECTOR (e) in that school year, was able to give us a copy of the last official report issued by the Ministry of Education and the National Institute of Educational Evaluation of the Angel Modesto Educational Unit with respect to the results in these tests are detailed as follows:

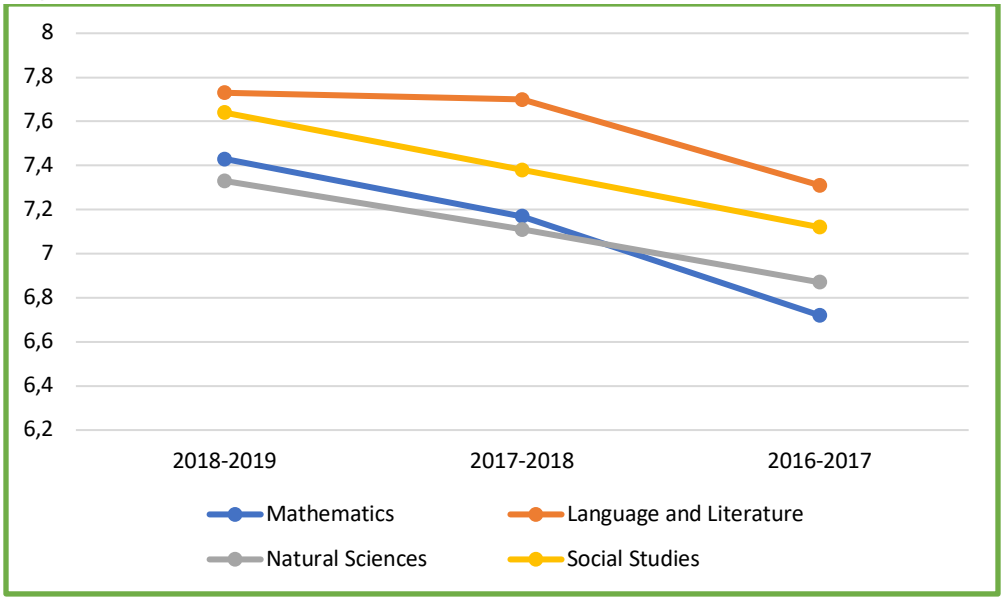
Table 2: *Ser Bachiller test results*

School Year	Evaluated	Mathematics	Language and Literature	Natural Sciences	Social Studies
2018-2019	65	7,43	7,73	7,33	7,64
2017-2018	105	7,17	7,70	7,11	7,38
2016-2017	109	6,72	7,31	6,87	7,12

Source: National Institute for Educational Evaluation

After grouping the information and the results obtained in each of the 4 fundamental subjects, we proceeded to make the following graphical representation, where it can be seen, according to the lines with markers in the 4 fundamental subjects, the global averages have not even reached a score of 8 out of 10 points:

Figure 1: *Ser Bachiller Test Results*

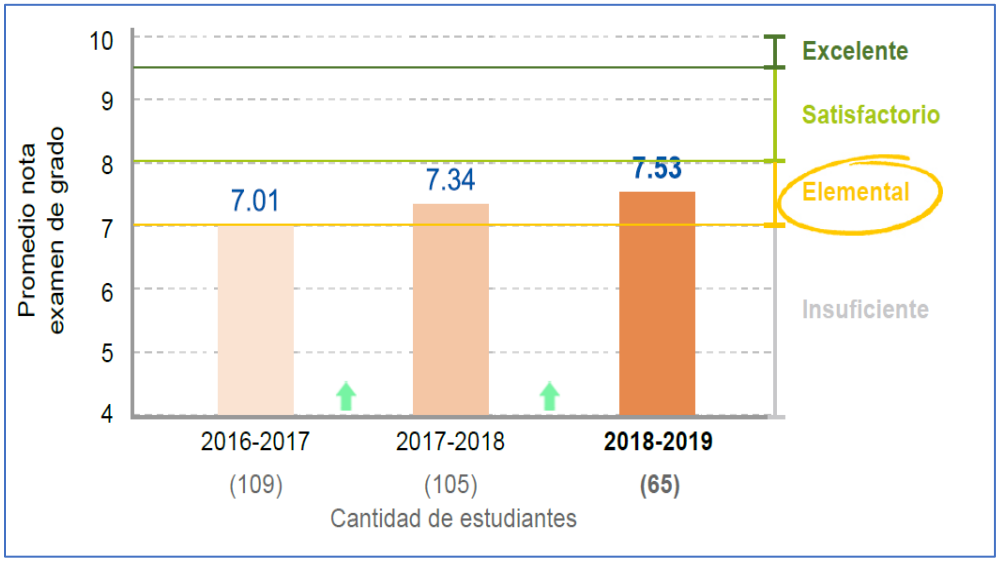


Source: National Institute for Educational Evaluation

Once the graphical representation was made, we proceeded to interpret the results in a general way and reach the following

conclusion: in the last 3 years it can be observed that the results do not vary with respect to the level achieved by the students. That is why, in relation to the last school period corresponding to 2018-2019, 65 students were evaluated, of which 35 were males and 30 were females, reaching an overall average of 7.53 points out of 10; that is, the results indicate that they are at an ELEMENTARY level of academic achievement as shown in the following graph .

Figure 2: *Comparison of grade point averages of degree exams*



Source: National Institute for Educational Evaluation

Therefore, with all the information presented, we proceeded to:

- Identify the areas that need to be strengthened in the students' learning, in order to create pedagogical strategies to improve their academic achievement.
- Analyze the strategies applied in the field with the best results in order to replicate them where reinforcement is needed.

Thus reaching the conclusion that the area of Natural Sciences is where there is a low academic performance in comparison to the

other basic subjects and, for this reason, it was decided to strengthen this area through the use of technological resources to improve the level of understanding of students and that this, in turn, is reflected in subsequent evaluations.

After having carried out the corresponding information analysis and determined the needs to be met, some limitations have been identified that would arise during the implementation of the project, in which it is indicated that most students have not used any type of virtual platform, so these students should be trained to carry out its implementation and, similarly, with respect to teachers in the area, since they do not have the knowledge to properly handle ICT.

MATERIALS AND METHODS

Population and

The population and sample selected for the study are shown in the following table:

Table 3: *Population of the Angel Modesto Paredes Educational Unit*

Item	Detail	Frequencies	Percentages
1	Authorities	2	2,35%
2	Teachers	5	5,88%
3	Students	78	91,76%
TOTAL		85	100.00%

Source: Data collected at U.E. Ángel Modesto Paredes.

Once the people involved in the proposal had been identified, working meetings were held with the authorities and teachers to

explain the purpose of the project once the need had been identified.

Information Gathering

- **Documentary review:** Analysis of bibliography, scientific articles and book chapters.
- **Instruments:** Surveys and Interviews.
- **Techniques:** Semi-structured interviews, Surveys.
- **Human Resources:** Researcher, Authorities, teachers and students of U.E. Ángel Modesto Paredes.
- **Materials:** Surveys, interview guides, notebooks, computer, printer, sheets of bond paper.
- **Financial:** A budget will be prepared to cover the costs of the research, including materials, expert fees and other expenses.

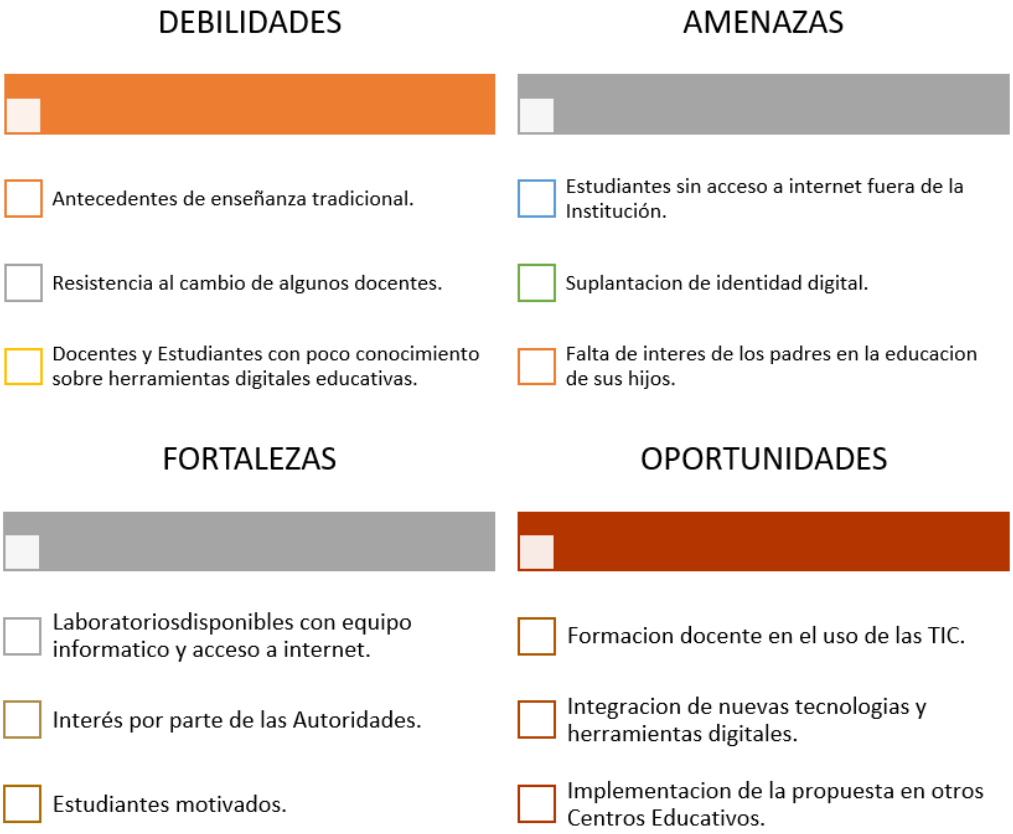
Data Collection Instruments

The instruments used in this study were the following:

- **Student Questionnaire**: To measure the level of class participation and the impact they feel on their academic performance.
- **Teacher Questionnaire**: To measure teachers' opinions on the effectiveness of ICT in the classroom, their experience with the Symbaloo tool and how it affects student motivation.
- **Interview**: To better understand the challenges and benefits of integrating a PLE in the classroom.

With all the information gathered from the interviews and surveys, following conclusions have been drawn, which are presented in the following SWOT:

Figure 3: *SWOT*



Scope of Research

The present research is exploratory and experimental, because it seeks to know how teachers and students view the use of Symbaloo and its effectiveness in fostering independent learning and improving students' school performance. It also studies the incorporation of ICT in the educational environment.

Materials

The materials used in the research are:

Table 4: *Materials*

Material	Description
Symbaloo Lesson Plans	Platform used as a key component of the Personal Learning Environment (PLE) to organize and share educational resources in the subject of Biology.
Technological Devices	Computers, tablets and projectors used to implement and monitor classroom activities.
Tutorials and Guides	Support documents provided to teachers to facilitate the use of Symbaloo Lesson Plans and optimize its integration in the classroom.
Internet access	Internet connection enabled for students and teachers to access the virtual resources and activities proposed in Symbaloo.
Digital Educational Resources	Digital tools such as videos, multimedia presentations, and interactive documents stored in the Symbaloo platform, used by students during classes.

This table clearly presents the main materials used in the research to implement the pedagogical model based on the Personal Learning Environment.

RESULTS

The analysis of the data collected is presented in two groups of participants: surveys conducted with students and surveys

conducted with teachers, offering a complete view of the effect of ICT on the teaching-learning process in the area of Natural Sciences for high school students.

Table 5: *Teacher Survey*

Ask	% Affirmative Responses	% Negative Responses
ICT promotes active learning on the part of students.	90%	10%
I consider ICT to be very important for teaching at the present time.	95%	5%
I find it positive to progressively integrate ICT in my subject.	88%	12%
I should be introducing ICT in my classes.	85%	15%
I believe that teachers should use ICT to facilitate student learning.	92%	8%

In addition, student surveys showed that most students know what the acronym ICT stands for and are comfortable using digital technology. This means that the person is very good with technology, which is beneficial for trying new ways of teaching in the classroom. Regarding the technological tools that teachers use, students said that the most common ones are computer presentations and learning programs on the Internet. They also mentioned that students can use the Internet at home or in Internet cafes, and have phones, computers, and tablets to do school assignments.

Another important finding was what students thought about how information and communication technologies affect their results in school. Many students indicated that using these tools in class can help improve their academic performance in Biology and other difficult subjects. However, some mentioned that using too much technology could make them do poorly in school. Therefore, it is important to use technology in a balanced and educationally thoughtful way.

Table 6: *Student survey*

Ask	Affirmative answers (%)	Negative responses (%)
Do you have internet access?	60	40
Do you have a device to surf the Internet?	70	30
Why do you think that school performance is not so high in the subject of Biology?	40	60
Do you think the use of ICT in the classroom would improve your academic performance?	80	20

In general, the results indicate that both teachers and students know that information and communication technologies are very important for teaching and learning. Teachers' willingness to try new things and students' interest in using technology are good for starting to use educational strategies with technology effectively and consistently. Student and teacher surveys give us a better understanding of how information and communication technologies (ICTs) affect education and the challenges we face in using technologies in the classroom.

Initially, the technology used by students seems to be good, as 60% have access to the Internet and 70% have technological devices that facilitate the use of digital tools, but there are still many who do not have access to technology. The neglected digital divide means that we must establish fair rules so that everyone has access to information and communication technologies and that some people are not left without access to education. Students believe that technology is a great help in their studies and 80% believe that digital tools can significantly improve their academic performance.

Teachers agreed that ICT is very important for teaching and learning, and can help students learn more actively. More than 85% think this is useful, but we still have some problems. This shows that it is important to increase teachers' teaching of technology and to focus on learning practical skills and maintaining a positive attitude towards innovation. Both students and teachers agree that technologies give them the opportunity to acquire more knowledge and improve their school performance, but they also show the difference between what students expect and what teachers expect.

Looking ahead, these results open many avenues for research and it is also important to explore how technology can be used in traditional education to engage students in self-directed learning, critical thinking, teamwork and problem solving. What is important is that schools, teachers and students work together to overcome technological and cultural barriers. It is important to note that the results of this study may not be fully representative because the sample is very specific.

Overall, the results of this study confirm the importance of ICTs in education, while indicating how issues such as access to these tools, resistance to their use and improving their use in different contexts can be addressed.

CONCLUSIONS

In the present research it can be summarized that through this formative proposal we try to stimulate the active participation of students both inside and outside the classroom. Thus, after having conducted the research regarding innovative experiences in the classroom, it has been determined that the use of ICT in education promotes learning that leads to improve student motivation.

That is why mention is made of the benefits of implementing a Personal Learning Environment, which aims to improve the academic performance of students and strengthen teaching skills with respect to the use of ICT, considering that among the defined population, students with learning disabilities have been identified and for this reason it was decided to develop a PLE that allows students to create their own learning path based on their answers (successes or errors). Likewise, the integration of digital resources, virtual learning environments and the use of technological equipment to the teaching work in order to promote and demand the adequate academic training of educators. It is intended that this report can be evidenced based on reliable educational experiences and that the results to be obtained during its implementation and thus teachers can assume a fundamental role with respect to educational strengthening.

At the same time, the professional development of teachers plays a fundamental role, since access to digital resources, virtual environments and technological devices means professional development. Transforming teaching practices, aligning them with the current needs of students. Finally, this research not only proposes innovations in teaching methods, but also shows how technology can become a central resource to improve educational processes. The relationship between the objectives of the project

and its purpose is clearly defined, demonstrating that PLE can enrich teaching and learning through personalized and fun strategies. With the implementation of these tools it is expected that students will not only achieve better academic results, but also develop a greater interest in learning.

REFERENCES

Adell Segura, J. &. (2010). Personal Learning Environments (PLEs): a new way of understanding learning. *In Roig Vila*.

Berenguer, C. (2016). *About the usefulness of the flipped classroom or flipped classroom*. Spain: University of Alicante.

Bergmann, J., & Sams, A. (2012). *Flip your classroom: reach every student in every class* . ASCD. .

Bergmann, J., & Sams, A. (SM (2nd ed)). Bergmann and Sams (2012), students are responsible for their learning through the use of the materials that were made available to them online. *2014*.

Bolaño Muñoz, O. E. (2020). Constructivism: Pedagogical model for the teaching of mathematics. . *Revista EDUCARE - UPEL-IPB - Segunda Nueva Etapa 2.0, 24(3).*, 488-502.

Durall, E. (2012). *Technological perspectives: higher education in Ibero-America 2012-2017 A Regional Analysis of the NMC and UOC Horizon Report.* Austin, Texas: The New Media Consortium .

García-valcárcel, A. (2005). *Medios Informáticos.* Retrieved from web.usal.es: http://web.usal.es/~anagv/arti5.htm#punto53

Henkel, J., & Kuhlemeier, D. (2007). The. *Computers and Education,*, 460-480.

Hinojo, F. J. (2019). Influence of the flipped classroom on academic performance. A systematic review. *Virtual campuses. 8(1)*, 9-18.

Marín, V. (2014). Personal learning environments and networks (PLE-PLN) for collaborative learning. *Comunicar, vol XXI, no. 42.*, 35-43.

Martín García, R. (2010). Pedagogical advantages in the application of PLE in language and literature subjects in secondary education. Analysis of five experiences. *Digital Education Review, no. 18*, 38-47.

Peña, I. (2013). The research-teaching PLE: learning as teaching . *Personal Learning Environments: Keys to the networked educational ecosystem.*, 93-110.

Rodrigues, P. J. (2013). Ambientes pessoais de aprendizagem: conceçoes e práticas. . *Latin American Journal of Educational Technology: RELATEC, 12 (1).*, 23-24.

Ruiz Franco, M., & Abella García, V. (2011). Creation of an educational blog as an ICT tool and TAC instrument in the university environment. *Teoría de la Educación. Education and Culture in the Information Society, vol. 12, no. 4*, pp. 53-70.

SIEMENS, G. (April 15, 2007). *PLEs - I Acronym, Therefore I Exist*. Retrieved from elearnspace: http://www.elearnspace.org/blog/2007/04/15/ples-iacronym-therefore-i-exist/

Torres Martín, J. M., Herrero Lorca, M. A., & Hernánez Fernández, M. A. (2015). SYMBALOO FOR THE DEVELOPMENT OF DIDACTIC UNITS BASED ON THE STUDENTS' PERSONAL LEARNING ENVIRONMENT (PLE). In R. A. González, *INNOVACIÓN Y ENSEÑANZA* (p. 137). University of Murcia, Servicio de Publicaciones.

Weller, M. (2011). A pedagogy of abundance. *Spanish Journal of Pedagogy*, 69(249).