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Article

Impact of the Blended Learning modality in the Physics subject at the Instituto Superior Tecnológico Simón Bolívar in Guayaquil

Impacto de la modalidad Blended Learning en la asignatura de Física en el Instituto Superior Tecnológico Simón Bolívar de Guayaquil

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Abstract

The objective of this work is to evaluate the impact of the blended-learning modality in a group of students who took the Physics course in a high school, with whom the Moodle platform was used as a virtual classroom. As main results, it was found that the students who passed this subject had a 78.9 % positive perception about the effectiveness of the B-Learning modality in the teaching of Physics, they emphasized that the application of exercises, games and workshops through the virtual classroom helped them to reinforce their knowledge, besides emphasizing the necessary skills that teachers should have. In conclusion, the implementation of this modality has had a positive impact on the learning process and it is suggested to continue applying it in this and other subjects for the benefit of education.

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Resumen

El objetivo de este trabajo es evaluar el impacto de la modalidad blended-learning en un grupo de alumnos que cursaron la asignatura de Física en un instituto, con los que se utilizó la plataforma Moodle como aula virtual. Como principales resultados, se encontró que los alumnos que aprobaron esta asignatura tuvieron una percepción positiva del 78.9 % sobre la efectividad de la modalidad B-Learning en la enseñanza de la Física, destacaron que la aplicación de ejercicios, juegos y talleres a través del aula virtual les ayudó a reforzar sus conocimientos, además de hacer énfasis en las habilidades necesarias que debe tener el docente. En conclusión, la implementación de esta modalidad ha tenido un impacto positivo en el proceso de aprendizaje y se sugiere continuar aplicándola en esta y otras asignaturas en beneficio de la educación.

Palabras clave: Blended learning, Moodle, enseñanza virtual - en línea, experiencias de aprendizaje, educación.

Introduction

Education is a constantly evolving field, where the integration of technology and new pedagogical methodologies play a fundamental role in improving the quality of teaching and learning. In this context, Blended Learning, or mixed learning, which emerged in the late 90s, is an educational strategy that combines the best of face-to-face and online teaching, which aims to provide a more enriching learning experience and adaptable to the needs of students. This modality has been widely adopted in educational institutions around the world and has proven its effectiveness in a variety of academic disciplines.

The Instituto Superior Tecnológico Simón Bolívar, located in Guayaquil, Ecuador, is a public institution that is committed to offering quality training and staying at the forefront of educational trends. In this line of thought, the question has been raised as to how the implementation of the Blended Learning modality could influence the teaching of a fundamental subject such as Physics. Physics, with its fundamental concepts and principles, is often considered challenging for many students. Therefore, it is essential

to explore how a strategic combination of face-to-face and online teaching could improve student understanding and performance.

The main objective of this study is to investigate and evaluate the 'Impact of the Blended Learning modality in the subject of Physics at the Instituto Superior Tecnológico Simón Bolívar in Guayaquil'. Through a blended approach, data collection and analysis will be carried out, seeking to understand how the implementation of this modality influences academic performance, student participation and student satisfaction in the subject of Physics.

Blended learning is a smart fusion of face-to-face learning and virtual environments with endless possibilities. With this approach, in addition to attending face-to-face classes, students can access online resources, multimedia content and interactive activities to enrich their learning experience.

The opportunities provided by new technologies can facilitate the educational process and give you the opportunity to do so, including new learning environments, such as hybrid learning models. Technology as seen from a student-centered education model (Valverde-Berrocoso & Balladares- Burgos, 2017).

Hybrid or blended learning is defined as a combination of face-to-face and online learning in the same educational environment. (Montoya, Parra, Lescay, Cabello, & Coloma, 2019).. Another author mentions that, this learning modality must choose the appropriate medium respecting each educational need. (Bartolomé, 2004). This model expands formal educational opportunities, makes students more adaptable to forms of interaction and communication, and allows better learning through the use of relevant and pertinent resources throughout the process.

Graham (2006) defines hybrid learning as the convergence of two typical learning environments, on the one hand, there is the traditional face-to-face learning environment, which has been used for centuries. On the other hand, distributed learning environments have begun to grow and expand exponentially with the expansion of technological communication and distributed interaction.

For his part, Carman (2002)points out five common elements that should be present in a hybrid model, related to life events, self-directed and self-placed learning, collaboration, evaluation and support materials. Thus, Mejía (2017) states that, in this type of environment, the central role of the student cannot be forgotten, as the main protagonist of learning and places the teacher as a

facilitator, whose fundamental purpose is to lead the student towards a comprehensive training, which guarantees the development of their cognitive skills and the effective use of the technological resources at their disposal.

Learning theories underpinning B-Learning

The main learning theories that support the B-learning modality are:

Skinner's theory offers three basic elements that as computerized technologies develop, discriminative stimulus, operant response and reinforcing stimulus take on new perspectives. Students receive real-time multimedia feedback on their knowledge through the correct use of tools. Technology tools are a fundamental support in the learning of specific and simple skills through positive reinforcement and repeated trial and error. (Guerrero, 1973).

For David Ausubel, meaningful learning is the immersion in B-learning strategies, which becomes evident when students develop interactive multimedia works on the Internet; where they connect what they have learned with new knowledge... (Camarillo & Barboza, 2020). (Camarillo & Barboza, 2020).. At the same time, Brunner's discovery learning can help B-learning when students learn through videos, documentaries or presentations. This learning is constructed by students using models and then implementing them into their cognitive structures as a basis for information processing (Eleizalde, Parra, Palomino, Reyna, & Trujillo, 2010)..

Piaget's theory stated that a person's psychological abilities are determined by feelings and perceptions. This is how each student regulates himself cognitively and is conscious of solutions to problems. (Piaget, 1977). For Vygotsky, if teachers encourage group work, the search for information on the Internet and the effective use of information technologies, this will help in the learning process; therefore, the construction of knowledge is formalized from the students' beliefs so that the student initiative becomes the central axis of their learning. (Vigostky, 1988).

Hybrid learning in the context of higher education

Significant changes are currently taking place in the development of new approaches in higher education. For Pallisé, Benedí and Blanché (2013)The Internet and ICTs provide greater opportunities and greater flexibility in the learning process, where people have greater access to resources and services and a more convenient place and time, although it also has a social component. Deficiencies in this regard may prove to be obstacles to greater learning.

The higher education sector, both university and technological, is an important source for the country's development, so it is its duty to go hand in hand with the technological transformation process. As indicated by Martínez (2016)The mission of higher education should be primarily the search for the development of society and the cultivation of high quality talents that are involved in society, in a critical and responsible manner; using scientific research and supporting information and communication technologies, using tools for self-management, interaction, communication and knowledge construction.

There is no doubt that learning takes place not only among the participants of the educational process in the classroom, in a given space and time. This process can also take place through the use of technological tools that allow the configuration of new learning alternatives.

Application of B-Learning in higher education

Knowledge transfer using the tools provided by information and communication technologies (ICT) is very common among students in higher education, but it is not a practice with a single purpose and competence, because institutions want to use technological tools in the learning process (Boatto, Flenogio, Bono, & Aguilera, 2021)..

In the case of higher technological education, not all the subjects are of on-site practice, the basic subjects have a high theoretical component, which allows them to be adapted to blended learning, although finally, the acceptance of the modality falls on the student who must be committed and responsible, working autonomously and persevering; leaving the face-to-face part for the tutor/teacher to make an effective feedback and clear the existing doubts.

In this modality, the structure of the virtual classroom is very important, since it is there where the student will have his or her autonomous learning path. According to Maureira, Vásquez and Garrido (2020) the greatest advantage of the face-to-face teaching model is that it frees teachers and students from the limitations of time and space. In the B-Learning model, the synchronous component may have as strategies the debates, workshops or seminars, where the teacher has control; while, in the asynchronous ones, the resources should aim at motivating the student to acquire the main role in his learning process.

B-learning' is an abbreviation of 'Blended learning', and is translated into Spanish in key terms such as 'blended learning', 'mixed learning'

or 'multiple scenarios', and its definition refers to academic contexts in which face-to-face activities are merged with E-learning, which is understood as an integrated modality of electronic learning. (Parra, 2008).. This approach aims to identify appropriate ways to meet training needs by introducing technological tools.

Advantages of B-Learning in the learning process

According to Bello (2013) B-learning has the following advantages:

a) Flexibility: allows students to progress through lessons and activities at their own pace.

b) Mobility: Students can access courses from anywhere, all they need is an Internet connection and a desktop, laptop, tablet or smartphone.

c) Extended Coverage: The tool has no problems when students are connected at the same time.

d) Efficiency: the student constructs his own learning.

f) Cost savings: Students save costs. Transfers can be made in addition to travel time in lieu of other academic or personal activities.

g) Diversity of content presentation: Technological tools make it possible to store different types of information for student use.

i) Interaction: Interaction among students is not lost, thanks to tools such as chats, mails, others.

Materials and methods

The approach to be used in this study will be the mixed approach. For Barrantes (2014)this is considered as a process that collects, analyzes and generates qualitative and quantitative data. This approach will allow the management of processes that allow a complete analysis of the impact of the B-learning modality on performance, satisfaction and participation in Moodle of a group of ISTSB students.

The design will be non-experimental. According to Kerlinger and Lee (2002) it allows empirical and systematic inquiry in which the researcher does not require direct control of the independent variables. Rather, inferences are made about the relationships between them. In this case, what is required is to know in a complete

way how the b-learning modality has influenced the learning of Physics in ISTSB students.

The study will be transversal. For Tamayo (2003) this allows the collection of data in a single period of time, its objective is to describe and analyze the variables at a given time. In this research, the academic period IS 2023 will be taken into account, which was developed from May to September.

The ADDIE Scientific Method, which according to (Castellano & Rocha, 2020) is an instructional design model used to develop online learning courses. ADDIE is an acronym that stands for Analysis, Design, Development, Implementation and Evaluation, its usefulness in the educational field is to guide the design process of online learning courses and can be adapted to different teaching modalities, including the Blended Learning modality.

The case study method is used to understand in depth a particular phenomenon or situation, through detailed description and analysis of the data collected, it focuses on a specific case to explore complex and subjective issues that cannot be measured or quantified (Morán , 2018). In this study, the grade records and statistics on student participation provided by the Moodle platform will be analyzed in order to cross-check this information with the results of the participant satisfaction survey.

By means of the survey, which for Sampieri (2014) is a fundamental tool in quantitative research that is used to obtain structured data through specific questions addressed to a sample of people for the purpose of measuring variables, evaluating attitudes or opinions, and performing statistical analyses to obtain conclusions. The survey consists of 14 questions, 10 of which present options according to the Likert scale and 4 are open-ended.

Convenience sampling, also known as non-probability sampling, is a selection method in which the elements of the sample are chosen because of their availability and convenience for the researcher, instead of being selected randomly or following some rigorous probabilistic process. (Barrantes, 2014). In the case of the students, it should be noted that the total number of students enrolled was 32 and those who passed the course were 19.

Results

The sample of students participating in this research corresponds to 89.15% of the age range of 18-30 years and 10.5% of the age range of 31-50 years. Of these, 63.2% were male and 36.8% female. Regarding familiarity with technology, 15.8% indicated a VERY HIGH level, 31.66% HIGH, 42.1% MEDIUM and 10.5% LOW. Regarding previous experience with B-Learning, 57.9% indicated SOME experience, 21.1% LITTLE and 15.8% NONE.

Regarding Academic Performance, it is evident that 89.47% of the students obtained a qualitatively evaluated score as VERY GOOD; 10.53%, GOOD. This indicates that the former master the learning of the subject of Physics and that the latter achieve the learning. This is consistent with their degree of satisfaction, since 57.9% are SATISFIED and 36.8% are VERY SATISFIED.

Regarding the competencies, 52.6% of the students indicated that their understanding of concepts was SATISFACTORY, 15.8% VERY SATISFACTORY and 31.6% NEUTRAL. Achieving that 78.4 % of the students indicate that the Physics concepts have been better understood thanks to the B-Learning modality.

With respect to the ICT resources, 68.4% rated it as SATISFACTORY; 21.1%, VERY SATISFACTORY and 10.5%, NEUTRAL. A total of 89.5% of those surveyed said that the reinforcement was positive. In addition, the most used resources were workshops (47.4%), evaluations (36.8%) and videos (15.8%).

Regarding Methodology, 47.4% of those surveyed prefer the TRADITIONAL PRESENTIAL MODALITY; 26.3%, B-LEARNING and 26.3%, NO PREFERENCE. Despite the positive impact on the use of resources to promote teaching and learning processes, the majority of students prefer this subject to be taught in face-to-face mode.

Discussion

The study conducted to evaluate the impact of the b-learning modality in a group of students of the Instituto Tecnológico Superior Simón Bolívar in the city of Guayaquil reveals important findings. Through data analysis, it has been shown that the implementation of this teaching modality in the subject of Physics has had a positive impact on the students' learning process.

Students' positive perception of the hybrid model leads to the belief that the integration of ICT in the learning process and the development of coherent strategies correspond to current forms of interaction and communication and expand the traditionally limited educational experience of students, given by the traditional face-to-face modality.

The resources used in the Physics course allowed students to become more involved in the subject, which is reflected in their academic performance. The MOODLE platform was integrated into this hybrid education proposal to provide students with greater motivation and engagement in the construction of knowledge.

Despite the fact that most of the students prefer face-to-face teaching, they highlighted the teacher's skills in handling the hybrid modality. This is conceived as an opportunity for the Learning Plans to gradually insert a greater amount of digital resources to be applied in student-centered learning activities that combine the virtual and face-to-face instances.

References

Barrantes (2014). Investigación, un camino al conocimiento, Un Enfoque cualitativo, cuantitativo y Mixto. San José - Costa Rica: Editorial EUNED.

Bartolomé, A. (2004). Blended learning: basic concepts. Píxel-bit Revista de medios y educación, 7-20.

Bello (2013). Blended learning (B-learning). Retrieved from http://www.uv.es/bellochc/pedagogia/EVA2.wiki?3

Boatto, Flenogio, Bono, & Aguilera (2021). university learning from hybrid tasks mediated by ICT: description of an instructional design in the framework of design-based research. Confluencia de Saberes. Journal of Education and Psychology, 1(3), 61-86. Retrieved from http://revele.uncoma.edu.ar/index.php/confluenciadesaberes/article/view/3106/pdf

Camarillo, & Barboza. (2020). Teaching law learning through an institutional virtual platform. Revista Pedagógica universitaria, 2, 143-165. doi:10.5354/0719-5885.2020.57035.

Carman (2002). BLENDED LEARNING DESIGN: FIVE KEY INGREDIENTS. KnowledgeNet. Retrieved from http://blended2010.pbworks.com/f/Carman.pdf

Castellano, & Rocha (2020). Application of ADDIE in the process of building a distributed educational tool B-Learning. Revista

Iberoamericana de Tecnología en Educación y Educación en Tecnología, 26.

Eleizalde, Parra, Palomino, Reyna, & Trujillo (2010). Discovery learning and its effectiveness in the teaching of Biotechnology. Research Journal, 71, 271-290. Retrieved from https://www.redalyc.org/articulo.oa?id=376140386013

Graham (2006). Blended learning systems. Definition, current trends, and future directions. Pfeiffer Publishing, 3-18.

Guerrero (1973). The psychological system of B.F. Skinner. Revista Latinoamericana de Psicología, 5(2), 191-216.

Kerlinger, & Lee (2002). Behavioral research. Research methods in the social sciences. Mexico: Mc Graw-Hill.

Martínez, J. (June 20, 2016). Theoretical construct in the production, interaction and exchange of knowledge through the mixed modality (b-learning) for the systematization of university development at UPEL-IMPM. Doctoral thesis in Education. Rubio, Venezuela: UPEL.

Maureira Cabrera, O., Vásquez Astudillo, M., Garrido Valdenegro, F., & Olivares Silva, M. J. (2020). Assessment and co-assessment of learning in blended learning in higher education. Journal of education Alteridad, 189-206.

Mejía, Palmero, & Sánchez. (2017). Hybrid learning spaces. MediSur Journal, 15(3), 349-355.

Montoya, Parra, Lescay, Cabello, & Coloma (2019). Scientific Information Journal. Pedagogical theories underpinning learning with the use of information and communication technologies, 98(2), 241-255. doi:551760346011

Morán , F. (2018). University of Barcelona. Retrieved from https://diposit.ub.edu/dspace/bitstream/2445/134322/1/FEMP_TESIS.pdf

Pallisé, J. S., Benedí González, C., & Blanché Vergés, C. (2013). Blended learning as a response to the new challenges of the university. Barcelona: Ediciones Ocatedro, S.L.

Parra, L. (2008). Blended learning: The new training in higher education. Advances: Engineering Research, 1(9), 95-102.

Piaget (1977). Psychology of the child. Madrid, Spain: Ediciones Morata.

Sampieri (2014). Metodología de la Investigación - 6th edition. Mc Graw Hill.

Tamayo. (2003). El proceso de investigación científica. Mexico: Editorial Limusa.

Valverde-Berrocoso, J., & Balladares- Burgos, J. (2017). Sociological approach to the use of b-learning in the digital education of university teachers. Sophia, 123-140. Retrieved from https://revistas.ups.edu.ec/index.php/sophia/article/view/23.2017.04

Vigostky (1988). El desarrollo de los procesos psicológicos superiores. Mexico: Grijalbo.