

# ORA learning objects as teaching resources

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**Abstract.** This work is focused on the ORA design and validation of an educational innovation, facilitating the teaching of Physics through innovative strategies that generate significant learning, such as the understanding and use of Physics knowledge in higher level students. This research is based on a qualitative methodology, in which a learning object supported by technological resources was used. Collaborative work was achieved in the classroom for the construction, understanding and application of Physics concepts. The attitude shown by the students towards learning Physics concepts was positive.

## Introduction

Instructional design and rationale are key elements in developing effective and meaningful learning objects. Instructional design refers to planning and organizing learning content and activities to achieve specific learning objectives. The rationale includes concepts and theories about learning and teaching, which must be considered when developing an ORA learning object. By combining these two elements, you can create a learning object that is effective, meaningful, and accessible to students. Instructional design includes identifying learning objectives, selecting and organizing content, creating activities and assessments, and validating the learning object before it is released. By considering the rationale for learning and instructional design, you can create more effective and meaningful learning experiences for students.

## Methodology for the Production of Learning Objects

Regarding its elaboration, according to [1], cited by [2], this involves five phases: a) Analysis, b) Design, c) Construction, d) Evaluation and e) Implementation; in this sense, a study of the demands, needs and typologies of the students must be carried out; said action has the purpose of visualizing the feasibility of the proposed solution. In this sense, this would be a fundamental stage since it defines the path to follow to reach the goal set.

## Learning Object Standards

The theory on which learning objects are based, according to [3] takes three methodological principles from the world of software engineering: Rapid application design, Object-oriented design, Open standards, The base scheme of the LOM, for example, is formed by a hierarchy of metadata, called data elements, grouped into 9 categories, which are shown below: 1. General. 2. Life cycle. 3. Metadata. 4. Technique. 5. Educational use. 6. Rights. 7. Relationship. 8. Observation. 9. Classification.

## Learning strategies

A skill is a systematic relationship to a task, a job or an exercise, because it is often called a method, plan, technique, procedural skill or performance that provides learning, supports correcting a problem or achieving any specific task; and in the educational context, teaching and learning strategies are clearly differentiated.

## **Tool - eXeLearning.net**

We used eXeLearning.net [4], which is an open source tool that facilitates the creation of educational content without the need to be an expert in HTML or XML. It is a multiplatform application that allows the use of content trees, multimedia elements, interactive self-assessment activities... facilitating the export of the content generated to multiple formats: HTML, SCORM, IMS, etc.

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## **Discussion of results**

The design of activities becomes relevant when learning objects are included in order to achieve learner motivation, more for the concept or topic than for the object itself. In other words, the student's focus should be more on the end than the means; For this reason, it is important to consider the impact and dose or cushion it to avoid rejection or deviation [5]. It is true that the rupture of paradigms is seen in two senses: the ability to carry out the process and the good judgment of the teacher, which will define the course of the results.

It is necessary to discuss how much innovation alone produced the results; how much it served as support and how much it requires traditional didactic complements to improve the appropriation of knowledge; Thus, critically analyse how much the learning object prevented a better conceptualization of the topic or content for the application of real problems.

## **Conclusions**

Teaching Physics has always been a challenge for students and teachers due to various factors; this research selected as an innovation topic the use of learning objects to facilitate the appropriation of mathematical knowledge and skills, in this case the resolution of inequalities, supported by the methodology of educational research based on evidence (IEBE). The application of the eXeLearning technique in different contexts allowed students and teachers to consider an innovative way of approaching the subject of Physics, through the use of Physics concepts for problem solving; with technological environments that positively modify the attitude of students towards the subject in question.

## **References**

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