



Title: Development and evaluation of 3D virtual tours as A cognitive basis of the chemistry laboratories at UTSV

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Currently at the Universidad Tecnológica del Sureste de Veracruz to get to know the laboratories and heavy equipment, it is always necessary to visit them physically to be able to visualize the facilities, equipment and tools necessary for the development of competencies in the chosen career. Laboratories are an important piece in the training of university students at the Higher Technical University (TSU) and Engineering level. Because the educational model is 70% and 60% practical at the aforementioned levels. One of the obstacles that have been presented to visit the laboratories is the location of the university outside the city, it takes a long time to move it, considering that the majority of the student population comes from far away places.



The present work aims to develop a 3D virtual tour of the Chemistry laboratories of the UTSV, which serves as a support for a digital approach without many walls that prevent knowing the area chosen for their professional training.

Araque, I., Montilla, L., Meleán, R., Arrieta, X. (2018) Describes that, with the appearance of ICT (Information and Communication Technologies), various strategies are included that combine methods, techniques and means available to the teacher, who has the responsibility to design and implement in favor of learning. Resulting in the development of different virtual learning environments, having as an inclination in the construction and acquisition of competences through teaching-learning.



Methodology to be developed

In the development of the 3D virtual tour, it was based on the Scrum agile development methodology, allowing assigning tasks to be elaborated and delivered in short times, measuring their progress with the end user. Likewise, in order to have the information of the 3D objects presented from the laboratories, it was necessary to carry out the field investigation.

A. Development of the virtual tour





B. Video evaluation

Plan the test

- Analysis and number of questions
- Likert scale
- Student and teacher management
- Dates for application

Design the instrument

- Selection of the platform to use.
- Design and capture of the questions and answers.
- Means to send the form

Run the instrument

- The link to the survey and the videos was shared with the teacher responsible for the groups in the Chemistry area, according to the dates previously agreed upon during the administration.

Analysis of the results

- Once the online evaluation instrument has been applied, it is evaluated according to the chosen answers, where the results of each question are shown..



Results

This section presents the 3D virtual tour, a walk where spaces designed in 3D combined with multimedia effects are presented, which allow to have a vision and approach to live an experience of reality, collaborating in the development of professional skills. The laboratories that were designed with a 3D tour were: General Chemistry, Instrumental Analysis and Chemical Plants.





Focusing attention on the following results: 92% of those surveyed believe that the 3D virtual tour video is suitable for getting to know the Industrial Chemistry laboratories at UTSV for the first time.

All of the respondents believe that the information presented in the video of the virtual tours of the Chemistry laboratories is clear, precise and understandable.

96% of those surveyed consider that the virtual tour through 3D Design allows them to experience significant learning since it serves as support in the learning process of the chemistry laboratories of the UTSV.

In general, the comments and opinions received refer to considering that the route offers a visual field of how the learning will be obtained, together with the quality of the service when assisting in person in the realization of the practices. Another aspect considered is the achievement of cognitive development in students, since derived from the application of virtual reality in 3D modeling, it was possible to obtain results that show greater interest and the possibility of acquiring significant learning derived from the conditions that were applied to it. present. to understand the information. On the other hand, it allows the teacher to privilege his role as a learning facilitator, focusing on the interests and possibilities of the student so that learning is comprehensive and according to different styles and channels.



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