

The use of videos in teaching could improve academic performance by 20%

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Educational videos are one of the most widely used resources in the world of education, in both online and on-site environments. A thesis by Victor Jesús García Hernández to obtain his doctorate in the doctoral

program in Education and ICT (E-learning) at the Universitat Oberta de Catalunya (UOC) analyzed students' perception of the usefulness of these audiovisual resources and their use in physics courses in the first year of engineering at the UOC, and at an on-site center, the Salesian University School of Sarrià (EUSS). The main result of the research in both learning environments is that videos are the resource most highly rated by students, but they see them as complementary to text materials. The study also found that more videos of problems are viewed than theory videos, and that this use increases when an examination or the submission of an assignment is imminent.

"In this [digital age](#), students see videos as useful and necessary, but they aren't a replacement for information in written texts for them. According to this research, they also view written documentation as the primary resource, and videos as an essential but complementary resource. A video helps to understand, but it's text that helps to provide in-depth knowledge and comprehension," explained Victor García.

The students also said that videos allow them to "save time and focus on what's important," and that they are particularly useful for a course like physics, since they help them to get to grips with aspects that are difficult to understand.

The joint supervisors of the thesis were Antoni Pérez Navarro, a researcher at the Internet Interdisciplinary Institute (IN3), and a [physics teacher](#) at the EUSS, and Jordi Conesa, a researcher in the SmartLearn group, who are both members of the Faculty of Computer Science, Multimedia and Telecommunications at the UOC.

Checking perceptions against real data

The research consisted of three stages, which each used a different methodology. First, there was a survey of 126 students which took place

over three semesters. The second phase involved in-depth interviews with fourteen students, and finally, the study analyzed how 1,031 students interacted with [educational videos](#) over five semesters. In other words, the points in time when they used the start, pause and search buttons while viewing were studied. "The aim of this holistic analysis was to obtain information about students' expectations of videos, what makes them attractive and useful, how they use them, what for, and how this use changes depending on which stage of their learning process they have reached," explained Jordi Conesa.

Antoni Pérez said that this research is "important because it puts the spotlight on the person and what these videos provide, but it doesn't stop there, as analyzing the use of these resources means we can confirm whether or not the students' perception is consistent with reality."

The results revealed some discrepancies between the students' answers and how they used these audiovisual resources during the course. "In the interviews, they said that they used the videos in the same way, regardless of whether the content covered a theoretical aspect or it was a problem-solving video. However, the subsequent data revealed that the problem-solving videos were used more intensively," explained Víctor García.

An analysis of these records also showed that the students interacted differently depending on the content: "how they watched the videos on electrostatics and circuit theory differed from how they watched those dealing with magnetostatics and mechanics," said Víctor García.

Videos with the teacher's hands and without the face

The study also showed the type of videos preferred by the students, who watched different formats. These included videos lasting between two and fifteen minutes, created either using applications capturing text

written on a digital tablet, or showing the teacher's hands as they write and explain the lesson. "The results clearly show that students don't need to see the teacher's face, but they do prefer human features to appear in the videos, and they prefer hands in particular, because they convey non-verbal information, and help to focus attention on what's important," said Victor Garcia.

For the new doctor, the fact that it is "effective and even advisable" for only the hands to appear "takes a lot of pressure off teachers, who don't have to become professional actors or know how to act in front of a camera." These preferences also show that there is no need to produce a complicated and expensive product to convey information and capture the attention of students. "Simplicity can be very effective and help both students and teaching staff. On the one hand, a whiteboard where only the teacher's hands are visible helps to focus on the content and reduce the student's cognitive load. On the other hand, it is an easy format to create, as all you need is a normal video camera, even one on a [mobile phone](#), and a small whiteboard," pointed out Víctor García.

Improved academic performance

Although it was not the objective of the thesis, the study also collected data on performance in physics courses before and after the videos were introduced. "The results showed that there was an average 20% improvement in students' performance in courses where videos were available compared to courses where they were not. However, there was no significant decline in people giving up the course—it was just 1% less," emphasized Victor Garcia.

Incorporating qualitative techniques into research

This thesis also highlights the importance of using qualitative techniques

such as synchronous interviews with students when analyzing issues related to teaching and identifying potential improvements.

"Questionnaires are usually sent out at the end of the semester. That is useful, but they don't provide the detail and depth that can be obtained in a semi-structured interview. I think that if [educational institutions](#) interviewed some randomly selected students as a complement to the questionnaires they already give out, they could have a better understanding of the students' teaching experience, and identify good practices and areas for improvement," concluded Jordi Conesa.

More information: Perception and use of educational videos in physics for engineering courses in classroom-based and online learning environments [Doctoral thesis]. hdl.handle.net/10609/139726

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