

# CONTROVERSY BETWEEN CURRICULUM DESIGN AND CURRICULUM DEVELOPMENT OF ONLINE "HIGHLY SPECIALIZED" EDUCATION IN THE FIELD OF CONSTRUCTION

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## Abstract

Nowadays, on a global level, the Higher Education System has a complex and broad horizon of curricular tools to use in the teaching and learning process. In addition to these new educational instruments, full of possibilities, we face specific socio-economic conditions that affect in a significantly way the Curriculum Development in certain knowledge areas (areas traditionally built on a methodology based on a physical presence of students in the classroom).

Some areas such as Restoration, Rehabilitation or Construction Pathologies, and the construction sector in general, require very defined and particular knowledge that only a small number of experts claim as specialized training. All these aspects condition the teaching methodology performed in a physical classroom at a university campus (the only option used until recent years) and made us consider the integration of online teaching in these areas too.

The present work shows the teaching methodology used for the development of two online courses, where we offer distance learning for "highly specialized" formation in the Edification area (an area where traditionally there was only classroom training). At the beginning, both courses were designed by classroom training, but got a really small number of applications due to the specialized topic proposed. Later, we proposed a "Curriculum Redesign" of the contents, offering an online modality, which implied a significant demand both within and outside the university area.

A notable feature of this educational experience is the great spectrum opened for attendees of both courses in the online version. This situation improved significantly the "Curriculum Development" for the student and implied an interesting new proposal on the offered contents and materials (what would have been really difficult to get in a face to face classroom).

In conclusion, the absence of certain types of specialized contents in the academic university curricula makes essential to raise new methodologies to save the gap in this area through additional training courses as those analyzed in this paper. Thus, our experience opens a debate on the appropriateness of implementing online training in relation to the face to face training in constructive content subjects and, especially, presents a new scheme, not without controversy, for the curriculum design.

Keywords: online teaching, highly specialized education, constructive content subjects, innovative methodology.

## 1 INTRODUCTION

Education at a university level requires strategies to enhance the adaptation of educational proposals to new and changing requirements of the specialized building sector.

Courses with highly specialized content force to accomplish a very definite curriculum design for a very specific and qualified target.

For further development of this kind of design, there are many valid tools in the teaching-learning process. But it is important to consider if online education can offer a response to the requirements of highly specialized training versus traditional classroom training developed year after year.

## 2 OBJECTIVES

The main objective of this research is to show the experience in two specialization courses developed in the area of building construction, offering interesting results regarding design and content development. These courses are:

- Safety and prevention in vertical works.
- Emergency shoring.

Both courses were offered in a traditional (face to face) design at the University of Alicante in 2012 but they finally did not achieve the minimum number of students for their development. Later, both were offered in an on line modality and they had a remarkable acceptance between students.

Due to this situation, our objective in this paper is to define which aspects have influenced the success of on line courses and the additional advantages obtained in online training when we offer "highly specialized courses".

These are the main objectives of the offered course **Safety and prevention in vertical works**:

GENERAL OBJECTIVES	SPECIFIC OBJETIVES
<ul style="list-style-type: none"> <li>• Improve workers security to risks from high falls in exposed situations</li> <li>• Train safety and vertical progression technicians for work in a hight height</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge of positioning techniques using ropes</li> <li>• Application of vertical progression techniques to optimize the performance of work in different industries according to efficacy and safety criteria, managing to reduce the cost of using traditional methods and reducing accidents.</li> <li>• Interpret technical information and incorporate new developments, trends and new materials in the industry.</li> <li>• Acquire a comprehensive and integrated use of vertical progression techniques within the different processes of building, understanding the role of facilities, equipment, techniques, organization, economic and human work.</li> <li>• Know the rules defining the requirements for the equipment (EPI) and materials.</li> <li>• Solve contingency situations that arise in the field of action in relation to people, facilities, equipment and materials.</li> <li>• Best way of acting in emergency conditions (calm and quick reaction), transmitting alarm signals and applying the established safety methods.</li> </ul>

**Fig 1.** Main objectives of the offered course: Safety and prevention in vertical works.

In this scheme, we have two difficulties to offer this kind of course. On the one hand, it is difficult to have local teachers and, on the other hand, it is also difficult to find appropriate students with the high level of specialization required in the course.

In this course, having qualified teachers was easy to find, but finding the minimum number of qualified students was not possible.



**Fig 2.** One of the activities developed in the course: Safety and prevention in vertical works.

Months later, the same course was redesigned to be offered in an on line form. The objectives listed above remained, but the course methodology was fully redesigned.

### 3 METHODOLOGY

The course was designed for students of Architecture, Technical Architecture, Building Engineering and other technical professionals.

Considering that specific areas such as Restoration, Rehabilitation or Pathology of the construction sector in general are closely linked to the development of propping and shoring, this course developed these general concepts.

These aspects are really important in the professional work but there is a great absence of this type of knowledge in the academic curricula of the university; because of this it is essential to save this gap through supplementary training as this course provides.

Moodle platform was used for the method described in the online course on "Emergency Shoring" and it obtained full enrolment, with students from universities of different countries and professionals with a high level of qualification, developing the following main contents in the program:

- **General principles**
- **Applicable legislation**
- **Knowledge of new tools and equipment used in the underpinnings**
- **Performing a beam vertical shoring**
- **Performing a cantilever shoring**
- **Making an inclined wall bracing**
- **Understanding various types of shoring. Making a light shoring**
- **Performing a bracing between medians**
- **Running a shoring in a pillar**
- **Planning and development of case studies**

We believe that the best method to achieve the objectives is not unique, and it is better to combine several options, choosing one or another depending on the learning situation. Considering this, these are the elements in which our methodology is based:



**Fig 3.** Elements of the proposed methodology.

In a learning situation it is possible to distinguish from those that have a strong theoretical character and those completely practical. Depending if we face on one or the other, we should choose a different method, as for example:

- **Expository method:** when we discuss theoretical aspects in a large group, with the support of teaching aids such as presentations, videos, etc.
- **Task assignment:** for activities requiring a greater control by the teacher because of the complexity of the content. Aimed primarily to a middle group.
- **Guided discovery:** for those tasks in which participants have a previous knowledge and are able to perform in an autonomous way with brief instructions from the teacher. Aimed to a small group.
- **Remote Tutoring:** mainly used at the end of a practical session, its aim is to unleash the concerns and questions of the participants. Also it will be the instrument for the assessment of the session.

Considering these methods, there are some strategies we can use:

- **Initial phase:** motivation and previous exposure of each subject, objectives, etc.
- **Development:** execution of considered activities.
- **Final phase:** assessment, analysis and discussion of the session.

Finally, the purpose of the evaluation proposed is to assess the degree of achievement of the objectives. It determines if aims are achieved efficiently and in a correct method, to decide which changes and improvement processes must be introduced to obtain a higher level of learning.

In this kind of course, evaluation cannot be conceived as a punctual performance but as an ongoing process (especially when a participant faces a practical situation even in his workplace.)

Also, if we consider the peculiarity of the course, the evaluation must be multiple and students should also intervene on it, not only with the self-assessment but also with their personal evaluation of the course.

Like this, communication is possible in both directions to correct any errors in the program design by using some evaluation techniques through a Moodle platform:

- **A questionnaire:** we use it to evaluate the course and for certain theoretical aspects of individual character.
- **Different Focus groups:** they are intended to, at all times, open new alternatives in groups.

## 4 CONCLUSIONS

In the course offered as a traditional learning (in person), its implementation was not possible because of a lack of students due to the following causes:

- Locally, there is not enough students trained to demand a highly specialized course.
- Students value the economic cost of the course and travels as a whole, as well as the time required to attend in person classes.

When the same course is offered online, it is observed that the number of requests is much higher, and the skill level of the students is very high. This question leads to further optimization of the content and student's production.

The method used has favored interaction using a moodle platform, showing that the high preparation of course participants enriches both students and teachers.

Courses in the online version are carried out by students of multiple nationalities, an interesting matter that enhances and complements the regulatory approaches in different contexts where each student develops his work.

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