

‘ARCHITECTS FOR THE FUTURE’: UPDATING AND TRANSFERRING CONTENT THROUGH NEW LEARNING EXPERIENCES

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Abstract

This project, which focuses on learning the new concept of sustainability in architecture, is part of the framework of a project for innovation and teaching improvement (PIME/UPV 2017-2018) and aims to contribute to updating and transferring the contents of three subjects in the undergraduate and postgraduate courses in Architecture at the School of Architecture of the Polytechnic University of Valencia.

In view of the unsuitable use of the concept of ‘sustainability’ exercised in professional practice, ARCHITECTS for the FUTURE aims to define this principle through experimental training based on the ‘learning by doing’ methodology, which consists of three tasks. The first of these, the review of specialist journals aims to identify the three pillars of sustainability – environmental, socio-cultural and socio-economic – and the associated parameters for measuring and assessing the sustainability of architectural interventions. The second task verifies compliance with requirements guaranteeing the sustainability level of several case studies while consolidating the knowledge acquired in the first task. Finally, for the third task a practical workshop offers students the skills needed to work with a sustainability certification online tool which the Green Building Council provides for individual countries.

This is why ARCHITECTS for the FUTURE is considered to be a project for improving innovation and teaching, as well as the learning experience of students through an active methodology.

Keywords: Environmental sustainability, socio-cultural sustainability, socio-economic sustainability, improved learning experience, learning by doing.

1 LEARNING SUSTAINABILITY

Sustainability is also a goal in the field of architecture and increasing numbers of interventions claim to have achieved this. Unfortunately, when further researching the design in many of these cases it can be observed that this much-desired value is diluted almost to the point of disappearing. In fact, at times it is only visible in roof solar panels in the best of cases, with the environment as sole justification.

From the stance of self-criticism, it must be recognised that architectural professional practice reflects built knowledge and skills developed as well as skills perfected during academic education. This is why architecture schools – and others - must acknowledge their responsibility in the success or failure of contemporary sustainable solutions and work on all three aspects – knowledge, competences and skills – in order to advance in this field.

This is the double starting point for the Project for innovation and teaching improvement “*Architects for the future*” *La sostenibilidad como factor de calidad en la arquitectura*, which a group of lecturers from the Department of Architectural Composition (CPA) of the Higher Technical School of Architecture of Valencia (ETSAV) has designed to update and transfer the content of the three subjects involved: Architectural Composition from the Degree in Foundations of Architecture; Restoration of Non Monumental Architecture, from the Master’s course; and Criteria for Intervention. From theory to practice, from the Master’s in Conservation of Architectural Heritage [1], thus guaranteeing their education through a practical methodology.

2 ‘ARCHITECTS FOR THE FUTURE’. PROJECT OBJECTIVES

From a triple exploratory, propositional and critical approach for advancing in skills relating to sustainability, “Architects for the future” proposes three main objectives:

The first is to raise awareness among students of the impact of design decisions in professional practice. It should transmit enthusiasm as well as commitment and safety in decision-making supported by fundamental principles and values in sustainability, also acquired in this phase.

The second objective is to validate the knowledge built up while working towards the first objective with the 'learning by doing' methodology and case studies specifically chosen by teachers. The aim of this is to develop the individual ability to solve problems through quantitative and qualitative analysis.

The third objective is to discuss the level of sustainability of some of the practical case studies examined in order to propose improvements at every level. This encourages students to challenge the current limits of knowledge on sustainability, proposing new exploration and research in the field.

In order to attain these general objectives it is first necessary to obtain specific learning results:

Firstly, to identify and describe the three fields (environmental, socio-cultural and socio-economic) of sustainability, listing the five parameters for each field which allow the level of sustainability of any intervention to be quantified and assessed. The classification produced as part of the project '3rd Versus. Heritage for tomorrow. Vernacular knowledge for sustainable architecture' [2] will be used as a model.

Secondly, to verify compliance with the 15 requirements relating to the three areas in the case studies chosen, classifying them according to the level of sustainability reached.

Thirdly, the correct handling of one of the certification tools backed by the Green Building Council, such as the VERDE tool [3] should be tested.

3 ACTIVE EXPERIENCES IN THE ACQUISITION OF NEW KNOWLEDGE, SKILLS AND COMPETENCES

The *European Qualifications Framework for Lifelong Learning*, adopted by the European Commission as a 'translation device to make qualifications more readable and understandable across different countries and systems' (CE, 2008) establishes three areas for education: knowledge, skills and competences [4]. This is why this project aims to transfer updated content with a methodology of interest to all three levels.

In addition, the transfer of content is considered to be just as essential or more than updating this content within the learning process. This is why the 'learning by doing' [5] technique, with its well-documented success, is chosen for application in all the different practical tasks which require active participation from students.

3.1 Case analysis and debate forums as tools for raising awareness among students

Raising awareness among students to guide architectural actions towards the field of sustainability requires the concept of 'sustainability' and parameters relating to it to be clarified. The review of specialist and current magazines is proposed to identify, analyse and compare different cases of sustainable interventions in order to complete this task. This will create a forum for discussion to contribute to discovering the characteristics common to the sustainable interventions, as well as summarizing the three pillars of sustainability and the five parameters for each in a diagram which will allow the sustainability of each intervention to be measured and assessed. (Fig. 1)

These tasks make it possible to educate the student in the field of knowledge, helping put false ideas and prejudices on the framework of sustainability to rest; as regards competences it awakens an eagerness to collaborate which is ideal for problem-solving; while in the field of skills, it improves mental agility, making it possible to recognize the parameters which define the level of sustainability of an intervention.

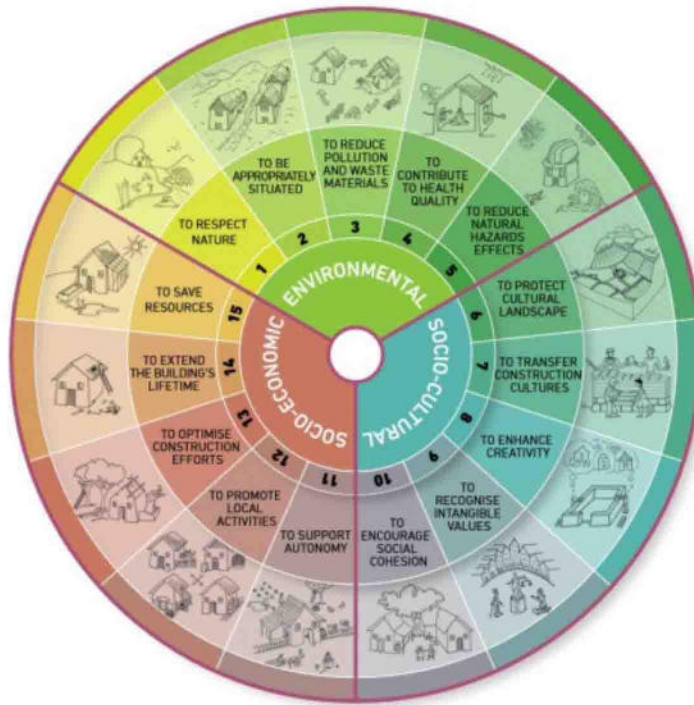


Figure 1. Wheel of environmental, socio-cultural and socio-economic sustainable principles.
 Extracted from (G. D. Carlos; 2014)

3.2 Interactive games for validating knowledge

After clarifying the concepts relating to sustainability, identifying its defining characteristics and listing the parameters which allow the sustainability of interventions to be assessed, an interactive game is proposed. This game uses the different intervention cases selected beforehand by the teachers to ascertain and validate the compliance or non-compliance of the parameters from the first objective in order to attain the second objective. The use of the *Socrative* [6] application is proposed in order to ask questions on specific interventions and the compliance with each parameter in person, and to receive the individual responses that all group members are sending to the classroom screen from their mobile devices, thus encouraging debate on the results for each question and choosing the person who got the greatest number of questions right as the final winner.



Figure 2. Example of question asked using the *Socrative* application

Once again the task contributes to the education of students as regards knowledge by checking on concepts learnt; in skills, it tests mental agility when questions are answered correctly as quickly as possible and; in terms of competences, it develops competitiveness.

3.3 Use of interactive tools to encourage critical thinking

The final task proposed is a practical workshop for initiation in the use of an interactive tool, VERDE, used to assess and quantitatively certify the sustainability of buildings. This free online tool is backed by the Green Building Council España (GBCE). The specific version tested will be the simplified *Herramienta de Ayuda al Diseño de Edificios Sostenibles* (HADES) [7] which allows environmental improvements to be quantified when applying sustainability criteria in designs. The actual task consists in introducing data relating to an architectural intervention, and twelve criteria which represent an 85% reduction in impact assessed with the general VERDE version and refer to location, energy consumption, natural resources, indoor ambient quality and social and economic aspects. This allows the reduction of impact based on individual criteria to be calculated – both in percentages and figures where 0 is usual practice and 5 the best practice possible. In addition, a final mark is provided for the intervention, the result of weighting the results obtained by impact category for the weights associated to impacts. The different results obtained by students awaken critical thinking so as to understand the relationship between measures adopted in sustainable design and impact reduction.

This task is also relevant for all three fields: knowledge, as it establishes association between measures for reducing impact and impacts connected with the parameters seen in previous tasks; in the development of skills, stimulating the controlled use of software and; in that of competences, where it encourages collaboration between peers.

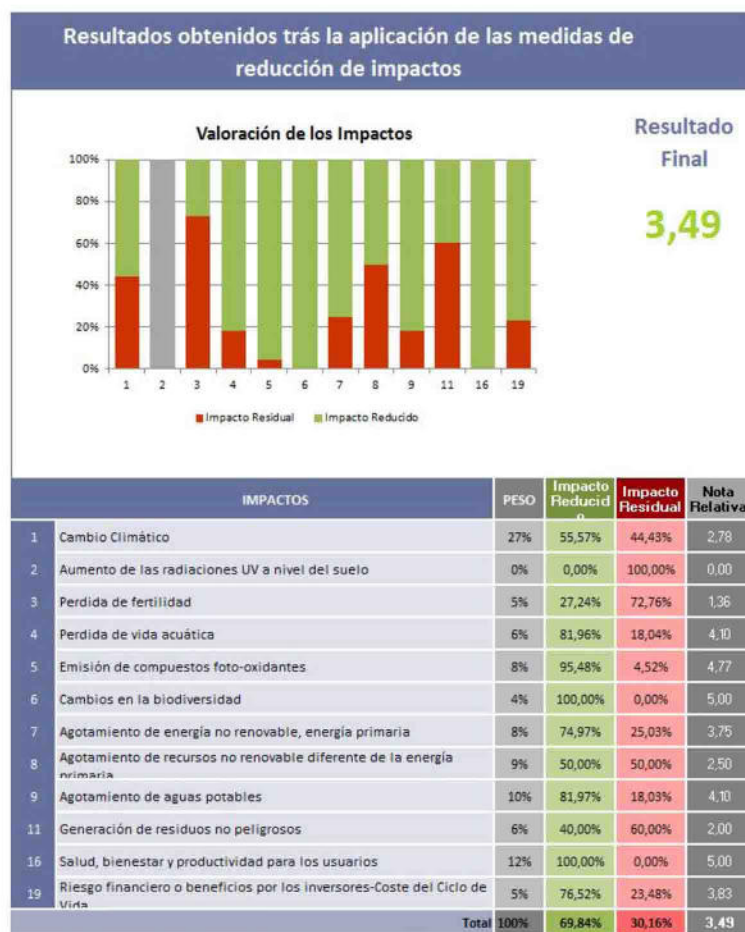


Figure 3: Example of results following use of the VERDE HADES tool

4 EXPECTED RESULTS AND CONCLUSIONS

To date, and owing to the academic calendar, the transfer of contents has been partly experimented with through the active methodology mentioned in the postgraduate subjects, although it is yet to be implemented in the degree course. Therefore, as an overview of the application of the project is not

available yet it seems timely to discuss the expected results, especially as not all the evidence can be gathered at this stage.

In the short term, the project will be considered to have been successful if the tasks relating to this educational project and the general tasks in the subjects involved are shown to lead to the correct and coherent use of the concept of sustainability. In addition, evidence provided by other subjects focusing on the design of architectural interventions, including Architectural Projects and Architectural Restoration, will reveal if the students applied the knowledge built up, the skills acquired and the competences developed.

In the long term, and based on the premise that sustainability in architectural design is not so much a voluntary choice but a necessity, a change of direction is expected in professional practice, both in the sustainable design of new architecture, studied in the degree subject Architectural Composition, and in the interventions in vernacular architecture, which are the focus of postgraduate subjects Restoration of Non Monumental Architecture and Criteria for Intervention. From theory to practice. This evolution will be reflected in a type of architecture reflecting a relationship which respects the environment and individuals, paying attention to social and economic values.

This text concludes in the hope that through this educational project success is understood not merely as an expansion of theoretical content but as a valuable opportunity to introduce changes into teaching, trying new methodological experiences in which students are active agents in the teaching-learning process and where teachers fill their work with emotion, thus generating truly effective learning.

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