137. ARCHITECTURAL EDUCATION FOR GREEN BUILDING DESIGN

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INTRODUCTION

Objective of the paper.

To present and explore the views of students, academics and design professionals regarding current professional education for sustainable architecture in Mexico.

Education for green building design is currently an imperative agenda within architecture schools. Professional practice is demanding architects with knowledge on green and sustainable design, who are also able to work in a multidisciplinary and collaborative environment.
A survey was conducted among undergraduate architecture students, and lecturers.

Students were selected randomly.

An additional survey was conducted among seven professionals: three academics and four building consultants and design professionals.
In the 2015 ranking of the 300 best universities in Latin America provided by QS (3) there are 31 Mexican universities offering undergraduate architecture studies.

The universities studied here were ranked number 58 (UDLAP) and 74 (BUAP).

In general, all those 31 universities include between 1 and 5 courses specifically related to environmental design, sustainability or similar topics, within their undergraduate curricula.
CASE STUDY 1: UDLAP

- The UDLAP is a private institution located in the city of Puebla in central Mexico.
- The Department of Architecture: Bachelor of Architecture, Bachelor of Interior Architecture and a Master programme in Architecture.
- 463 enrolled students; 11 full time lecturers and 16 part time lecturers.
- The questionnaire was distributed by email to all enrolled students and all academics.
CASE STUDY 2: BUAP

- The BUAP is a public institution located in the city of Puebla in central Mexico.
- The Faculty of Architecture: three bachelor and five postgraduate programmes. The bachelor courses are: Architecture, Environmental Urban Design and Graphic Design. The postgraduate courses are: Master in Architectural Design, Master in Architectural Technologies, Master in Urban Design, Master in Building Heritage Conservation and a PhD in Urban Studies.
- A printed version of the questionnaire was distributed randomly among students and lecturers.
<table>
<thead>
<tr>
<th>UNIVERSITY</th>
<th>ENROLLED STUDENTS</th>
<th>LECTURERS (full and part time)</th>
<th>% OF RESPONDENTS: STUDENTS</th>
<th>% OF RESPONDENTS: LECTURERS</th>
<th>STUDENTS AGE</th>
<th>LECTURERS AGE</th>
<th>LECTURERS EDUCATION BACKGROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>UDLAP</td>
<td>463</td>
<td>27</td>
<td>39% (n=179)</td>
<td>59% (n=16)</td>
<td>18-23 years old</td>
<td>30-67</td>
<td>13 Architects 2 Civil Engineers 1 Interior Architect</td>
</tr>
<tr>
<td>BUAP</td>
<td>1500</td>
<td>200</td>
<td>7% (n=100)</td>
<td>10% (n=20)</td>
<td>18-23 years old</td>
<td>35-67</td>
<td>16 Architects 1 Civil Engineer 1 Graphic Designer 1 Urban Planner</td>
</tr>
</tbody>
</table>
CASE STUDY 1: UDLAP

- Only two courses include topics related to sustainability: Ethics for sustainable development (5th semester), and Space environmental quality (6th semester).

- There are other two optional courses related to sustainable design: Sustainable architecture, and Introduction to environmental engineering.

- 44% of students said they have included sustainable techniques in a project, and 56% said they have not.

Table 2 - Importance of the relationship between sustainability and building design (UDLAP).

<table>
<thead>
<tr>
<th>% of respondents</th>
<th>It is not important</th>
<th>Little important</th>
<th>I do not know</th>
<th>Important</th>
<th>Very important</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
<td>29%</td>
<td>69%</td>
<td>179</td>
</tr>
</tbody>
</table>
CASE STUDY 1: UDLAP

Figure 1 – Satisfaction regarding green building design education received.
CASE STUDY 1: UDLAP

- Lecturers.
  - All of them stated to be familiar with the sustainability concept.
  - 50% have a degree, certification or postgraduate diploma in subjects related to sustainability, such as: renewable energy, LEED certification, sustainable development, eco-design, etc.
  - 94% incorporate sustainable design concepts in their courses, and 6% answered They do not.
  - 94% said it is necessary to offer continuing education on sustainable architecture for lecturers.
CASE STUDY 2: BUAP

- Only one course is related to sustainability: Natural comfort techniques (6th semester).
- 63% of students said they have included sustainable techniques in a project, and 38% said they have not.

Table 3- Importance of the relationship between sustainability and building design (BUAP).

<table>
<thead>
<tr>
<th>% of respondents</th>
<th>It is not important</th>
<th>Little important</th>
<th>I don’t know</th>
<th>Important</th>
<th>Very important</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
<td>33%</td>
<td>65%</td>
<td>99</td>
</tr>
</tbody>
</table>
Figure 2 – Satisfaction regarding green building design education received.
CASE STUDY 2: BUAP

- Lecturers.
  - 95% are familiar with the sustainability concept.
  - 10% have a degree, certification or postgraduate diploma in subjects related to sustainability, such as: renewable energy, LEED certification, sustainable development, eco-design, etc.
  - 85% incorporate sustainable design concepts in their courses, and 15% answered They do not.
  - 95% believe it is necessary to offer continuing education on sustainable architecture for lecturers.
  - Modify programme’s curricula in order to include sustainable design concepts in each course.
  - Recommend to organise and participate in sustainable architecture contests, green festivals and field trips.
<table>
<thead>
<tr>
<th>Company</th>
<th>Does Employment market need architects with sustainable design knowledge?</th>
<th>Does present architecture education respond to project’s needs?</th>
<th>How can architecture education be improved in order to integrate sustainable design in alumni skills and knowledge?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kiltik consultoría</td>
<td>Yes, of course</td>
<td>It does not respond. Academics have no practice experience; therefore they do not know market needs.</td>
<td>More lecturers with professional experience.</td>
</tr>
<tr>
<td>TECO arquitectos</td>
<td>Yes, knowledge on passive systems, certification systems and Mexican norms.</td>
<td>It does not. Graduates have some incorrect sustainability knowledge; they seem to think that is something separated from architecture.</td>
<td>More lecturers with professional experience.</td>
</tr>
<tr>
<td>University of Guanajuato</td>
<td>Yes, of course</td>
<td>It does not respond.</td>
<td>Including more practical courses and modules.</td>
</tr>
<tr>
<td>University of San Luis Potosí</td>
<td>Yes. More ethics and an integral academic preparation</td>
<td>It does not, because sustainability is taught as separate modules, mainly optional.</td>
<td>Change in architecture curricula.</td>
</tr>
<tr>
<td>University of Guanajuato</td>
<td>Yes</td>
<td>It does respond, but there is a low insertion of professionals in companies.</td>
<td>Including more practical courses and modules.</td>
</tr>
<tr>
<td>TEET</td>
<td>First educate lecturers to then transfer their knowledge to students.</td>
<td>It does not respond. There is no evidence of it within the city.</td>
<td>More lecturers with professional experience.</td>
</tr>
<tr>
<td>Revitaliza consultores</td>
<td>Yes. Architects have started a market transformation towards sustainability.</td>
<td>It does not. BArch Graduates do not know anything about sustainability.</td>
<td>Change in architecture curricula.</td>
</tr>
</tbody>
</table>

Table 4 – Professionals’ views regarding sustainable architecture education in Mexico
CONCLUSIONS

- Need to change architecture programmes in order to include sustainable design in every course.

- Holistic education with a sustainability approach, where every project designed shall be sustainable.

- Future work: to conduct several focus groups in both universities in order to obtain more detailed ideas and suggestions from current students, lecturers and building professionals.
CONCLUSIONS

- Educate academics, both lecturers and directors, in order to have human resources with an adequate sustainable design preparation so they can design, implement and assess curricula changes.

- Changes in university curricula must be assessed with the help of university programmes certification organisations (in Mexico: ANPADEH, CENEVAL).

- Advisers shall be professionals with sustainability knowledge.

- Architecture students must have access to specialised software, labs and real projects hands on experience.

- Professional requirements to become an architect in Mexico shall include sustainability/environmental design knowledge and skills?
Thank you!

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