

# Earth building as an opportunity for greater practical orientation in university curricula

A plea for a more holistic perspective to the teaching of architects and construction engineers – the example of Wismar University of Applied Sciences

Today's young architects, construction engineers and interior designers are increasingly facing a need for a more global perspective on and appreciation of building cultures. Universities and architecture schools must respond to this accordingly in the design of their curricula. Good design and planning skills are just one aspect; organisational talent and the ability to work in an international team and in the context of foreign cultures with foreign clients are another. Designers need to know about materials, their properties and working methods in order to assess their appropriateness, but they also need to be able to find a common language when working with and liaising between clients and contractors, experts and laypeople.

In addition to communicating professional skills and knowledge, university education should therefore also address personality development as this is also vitally important for the later professional success of its students.

## Personal motivation

As a member of the teaching staff at Wismar University of Applied Sciences, I'm often surprised that students of architecture and interior design have very little practical idea of the building they have planned in theory. In Germany, universities of applied sciences – called *Fachhochschulen* – have a stronger practical orientation and focus more on professional fields than traditional universities – called *Universitäten* – which are more academic and research oriented. This practical focus should be reflected in their teaching curricula. For this reason, I run a seminar course that includes a series of mandatory days of practical construction work, and it is here that many of the students' practical deficiencies rapidly come to light. My experience of several semesters shows that:

- most students are unable to begin work at 7:00 a.m., as is usual on most building sites in Germany. Many are not even ready to begin work promptly at 9:00 a.m.
- the majority of students ignored a request to wear clothing that is safe and appropriate for working in.
- work interruptions are frequent, and smartphones were used during work.
- many students are not used to physical work, necessitating more breaks than planned.
- most students are so ergologically and ergonomically challenged that even the safe use of a ladder posed problems, let alone the efficient handling of a trowel or shovel.
- many students, even those nearing the end of master's studies, did not recognise building defects, properly understand the sequence of construction tasks or their respective purpose and importance.
- dangers and hazardous situations were often misjudged.

One might conclude from this that the students lack the necessary motivation but in actual fact, for the vast majority of students, the opposite is the case: most students elect to take my seminar precisely because of the on-site practical work. They are, for the most part, highly motivated; and they are also acutely aware of their lack of practical skills and therefore interested in doing practical work.

## Social relevance

If we consider this in a broader social context, the problems described point to a general lack of experience, of empathy towards the work of others and the aspects of life and work that they cover, and ultimately to an inadequately developed appreciation of values in society.



Fig. 1 Building with adobe bricks on the 1st Eco-Building Day at Wismar University of Applied Sciences in 2014



Fig. 2 Working on the building site: mixing mortar



Fig. 3 Making clay tiles for the construction of a Catalan vault on the Campus of Wismar University of Applied Sciences as part of the 3rd Eco-Building Day in 2016

With Confucius' famous saying in mind – *“Tell me, and I will forget. Show me, and I may remember. Involve me, and I will understand.”* – I have endeavoured to introduce practical modules into the education of architects and engineers at my university, and to establish a suitable organisational framework within which this can take place. Ultimately, my hope is that these currently optional electives will become a mandatory part of studies.

My motivation here is not to do something new but to introduce what Pestalozzi and Montessori<sup>1</sup> for example, have elaborated in detail in another context, with all its diverse aspects and implications, and to transfer this holistic approach to my context of academic teaching.

One might argue that it is not the role of universities or colleges to act as a corrective for social deficits that are the responsibility of the family or community. And while it is undoubtedly not the role of universities or colleges alone, I am of the opinion that universities, and especially universities of applied sciences, which have a strong practical orientation, should communicate the practical relevance of the material that they teach. As such, improving practical competencies and expertise is, in my view, very much a central task of university education, particularly in the education of architects and interior designers, and especially where no other forms of education exist that serve this purpose or even make one aware of the relevance of the lack of such competencies.

If, given the increasing academisation of society, we wish to reverse the trend towards a two-tier society, it is important that we start implementing changes in both how we teach and how we learn, if not everywhere then at the very least in studies with a strong practical orientation!

#### **Institutional and international perspectives**

At Wismar University of Applied Sciences, I am at present more or less the only lecturer to offer a period of practical experience as part of an elective module, and the only one to explicitly give grades for work undertaken while taking part in the practical assignment.

At the university, attempts to find ways to improve interdisciplinary collaboration between the Faculty of Design and the Construction Engineering Department of the Faculty of Technology surface at irregular intervals. Practical, in-depth modules are an ideal vehicle for such collaborations as their core intention ties in well with both the university's overall aims as well as those of the respective faculties.

The teaching concept I present here for universities of applied sciences involves using a reversible, error-tolerant, recyclable material – earth – and presents a holistic approach to studies that includes an obligatory period of practical building site experience, where possible abroad.

With respect to the international character of studies at Wismar University of Applied Sciences, current developments leave significant room for improve-



Fig. 4 Working on the building site: fitting wattles into the timber structure

ment. While on the one hand, the university's facilities are becoming ever more attractive to students from abroad, and the face of the university is changing dramatically as a consequence, it is surprising to note that when asked, German students admit to having little theoretical or practical experience of studying or working abroad. They perceive this as a shortcoming and attribute it to lack of opportunities and of corresponding financial support.

It would seem to me that, more than many other subjects, courses of study such as architecture and interior design are no longer bound to regional cultural landscapes, building materials and formally-deterministic conventions and have long-since adopted a more global perspective. Regardless of whether one finds this development regrettable, it is nevertheless important that teaching enables students to respond to international needs.

#### Course content and didactic approach

Currently I am the only lecturer and member of staff at Wismar University of Applied Sciences to offer a seminar on earth building uniting both theory and practice. I have run the course now for several years and while the focus of each course is different (new building/renovation, Africa/Europe, research/experimentation), every seminar involves a period of practical work (see figures 1-5) on a building site (in Germany) which is assessed as part of the seminar grade (see figure 6).

In the last few years we have been able to initiate two official cooperative projects with Morocco<sup>2</sup> and Ghana<sup>3</sup> and the first student workshops have since taken place on location. They are based on jointly de-



Fig. 5 Compressing earth for a rammed earth wall as part of the 2nd Eco-Building Day in 2015

veloped building or renovation concepts elaborated over the course of the seminar and involve working together and exchanging knowledge with experts and students in the respective country.

The intention is not only to anchor suitable didactic methods in the curriculum and to communicate practical teaching and learning and the corresponding competencies, but also to apply and strengthen these through international exchange abroad. The theoretical construction or renovation projects developed in the seminar should be realised in practice, not just on building sites in Germany but also in locations where earth, as an ideal and forgiving building material for trial and error, is available cheaply and locally, such as in Africa.

Together with partners and partner institutions<sup>4</sup>, an exchange between German and African students aims to strengthen their respective theoretical and practical competencies and at the same time promote the learning of soft skills.

Soft skills refer to the social competencies of students and the schooling of behaviour and interaction. According to Hüttmann, most students fail to realise their full potential (in studies and in later life) not as a result of the limits of their intellect but as a product of ineffective interactions and communications, i.e. a lack of soft skills<sup>5</sup>.

That this will require teaching staff and personnel to acquire new, or at least other skills in order to assist students in their personal and personality development is reflected by the founding of institutions such as the ZHE<sup>6</sup>, which aims to help universities and their



**Weighting of the course assessment**

- 50% Practical work on the building site / in the laboratory
- 33% Active participation in the seminar work
- 17% Examination on basic knowledge of earth building

Fig. 6 Relative proportional weighting of the assessment criteria for the seminar

staff master the changing nature and challenges of their job as it shifts from that of a traditional *lecturer* to that of a supportive *advisor*.

Work on projects that students have ideally themselves initiated or contributed to is a good opportunity for them to develop and strengthen both personal and social competencies. Here the focus is less on the final product than the process that leads to it and the possibilities this offers to practice not only working methods but also organisational and interpersonal skills<sup>7</sup>. As such, practical training modules should be chosen in which the quality of the end result is not of paramount importance or in which a certain stage of the building construction needs to be attained. On-site practice should ideally be able to accommodate learning by trial and error, perhaps even the ability to repeat certain construction steps without impacting adversely on the budget or time schedule of the project.

My teaching and learning innovations aim to strengthen the following key competencies:

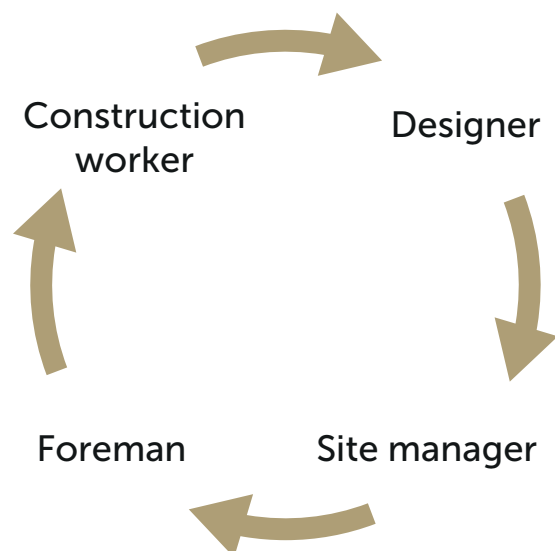
- communication skills
- conflict tolerance and handling
- capacity for teamwork
- independent work
- sense of responsibility
- capacity for (self-)reflection
- management skills

Students prepare for work on the building site through guided but ideally independent learning, so that they acquire systematic knowledge and guide-

lines on construction. A number of trainee meetings take place as part of this process.

A further part of the teaching and learning innovations is to allow students to experience the joint project from different perspectives through a form of role play in which students switch roles to allow each student to understand the different hierarchies and levels of responsibility and authority. For example, one of the students may assume the role of the foreman, who is answerable to the construction manager, also recruited from the pool of students. He or she, as representative of the planning office on site, gives a daily report on the organisation of the building site and project progress (figure 7).

Fig. 7 Students switch roles to experience changing responsibilities and obligations





Figs. 8 + 9 Working together with and learning from locals: Making a ladder of bamboo on Lake Agege Farm in Ghana; Weaving a reed mat for the renewal of a ceiling in the Tamnougalt Casbah in Morocco

A joint round of reflection at the end of the project presents an opportunity to take stock of what has been learned over the duration of the on-site practice at different levels, for example about the project itself, about the construction process and skills as well as at a social level. The function of the teacher shifts from that of a lecturer to that of an advisor accompanying his or her students. Johner describes this paradigm shift as a switch from the “push-principle” of the lecturer to the “pull-principle” of the student.<sup>8</sup>

The shift from a passive, obligation fulfilling student to an active, questioning student inevitably kindles a general thirst for knowledge that I have increasingly missed in recent years. It is possible to positively encourage students to question what they are doing and through this to identify and then ask questions.

Through the above approach, I hope to assess how successful and how sensible it is to develop realistic hands-on training opportunities for university projects such as this.

The students are asked to elaborate a catalogue of criteria by which those undertaking the construction work can assess the quality of the design, and the designers can assess the quality of the construction work. This makes it possible to better understand the legibility of design proposals with regard to their practical relevance and realisation. As such, students are better prepared for later professional practice.

With respect to the two specific cooperation projects with Morocco and Ghana, working drawings were developed for the respective building site prior to the practical construction work on site taking into

account the needs of the local users, the selection and organisation of working materials, how they are to be transported to the site as well as other country-specific factors.

Through many years of prior experience of cooperative projects, this approach and its realisation seems realistic. Both Morocco and Ghana have extensive experience of working with earth as an ecological and sustainable building material as part of their culture and landscape. As such, the seminar also makes us aware that Africa is not only a developing continent in need of our help, but that from time to time, and especially in this project, we can also learn a lot from Africans.

#### Footnotes

- 1 The underlying principle of Pestalozzi’s educational approach is to provide a sufficient foundation of elementary knowledge to enable people to help themselves. This is similar to “Help me to help myself”, the credo of the Montessori approach that would follow later
- 2 [www.kasbah-des-caids.com](http://www.kasbah-des-caids.com)
- 3 [www.lake-agege-farm.info](http://www.lake-agege-farm.info)
- 4 CERKAS (Centre of Conservation and Rehabilitation of Architectural Heritage of Atlasic and Subatlasic Zones), Ouarzazate, Morocco  
BRRRI (Building and Road Research Institute), Kumasi, Ghana
- 5 Hüttmann, A., *Erfolgreich studieren mit Soft Skills*, 2016, Wiesbaden
- 6 Zentrum für Hochschuldidaktik und Erwachsenenbildung, Pädagogische Hochschule Zürich
- 7 Johner, R., *Begleitung von Projekten im Hochschulstudium*, in: *Zwischen Beratern und Dozieren*, Hrsg. Thomann, G., Honegger, M., Suter, P., 2011, Bern
- 8 *ibid.*, S. 125

