

## Current challenges and opportunities in training and further education in earth building

The spectrum and variety of products in the field of earth building spans more trades than most other materials. At the same time, building with earth entails making a commitment to a material that plays a comparatively small role in the construction sector in a market ever more regulated by statutory ordinances, regulations and standards. The requirements that earth building materials and building with earth need to fulfil in today's construction sector requires specialist knowledge and skills in the planning and execution of earth buildings in order to guarantee safe, good-quality construction. This in turn has led to an increasing demand for well-trained, qualified professionals who are familiar with the material and have the appropriate theoretical knowledge and practical skills.

Following the addition of earth building as a subject area to the framework for vocational training in the building industry, the development of a corresponding earth building vocational qualification module and the establishment of a "Specialist for Earth Building" professional development training course, building with earth must now be incorporated more broadly, through these and other means, into the basic training of the building trades.

The current restructuring of the building trades, which has been ongoing since mid-2019, presents a good opportunity for this. It is nevertheless a complex and protracted process, and our involvement requires determination and perseverance.

The strategic goal of the Dachverband Lehm e.V. (DVL) is to see earth building firmly anchored as a regular learning field of the core curriculum of vocational training. The re-introduction of DIN standards for industrially produced earth building materials in 2013, and their expansion in 2018 also adds impetus

to the need for corresponding training skills in the construction sector.

The chambers of trade and crafts and the vocational schools are called upon to provide vocational training in this field, while in the academic realm, this falls to teaching staff at the faculties of architecture and civil engineering courses.

Building with earth requires know-how: know-how in building practice, in product development, in marketing and not least in planning!

In the second part of this article, the authors discuss their experiences of teaching practice in different higher education institutions and outline possible strategies for introducing earth building to the teaching curricula. While the focus here is on the German education system, the principles are transferable to other countries and education systems.

As in the vocational sector, the introduction and establishment of DIN standards for industrially produced earth building materials also requires that architects and civil engineers acquire corresponding skills in the design of structures with earth building materials.

The electives now offered at several universities are a step in the right direction, but to improve adoption, building with earth needs to be included in the regular curricula of university institutions. This aligns well with the learning goals outlined in the study programmes of many colleges and universities that are increasingly placing a stronger focus on sustainable and holistic approaches to construction and design.<sup>1</sup>

A consequence of the strong design-oriented curricula of many university courses is that architecture students are now ever more proficient in digital de-

sign tools but lack an understanding of materials. To close this gap, it is necessary to develop practice labs – ideally in the setting of a construction site – that allow students to experiment through trial and error and reflect on what they are producing.

We discuss a method that combines the teaching of theory and practice and expands it to include the training of so-called *soft skills*, which are crucial for the students' later professional life.

### **Earth building in the vocational training of the building trades**

#### **Restructuring of the building profession**

The Dachverband Lehm e.V. has liaised regularly with the Zentralverband des Deutschen Baugewerbes e.V. (ZDB, Central Federation of the German Building Trade) on the inclusion of earth building in the process of restructuring vocational training in the building trade since 2014 when the proposal was first made. The procedure finally began in mid-2019 and covers 16 building trades from road building to building construction and interior outfitting. Before the process began, top-level talks on education policy were held between the three tariff parties, the ZDB, the Hauptverband der Deutschen Bauindustrie e.V. (HDB, Federation of the German Construction Industry) and the German construction workers' trade union IG BAU. The procedure is currently at level 2 in the so-called elaboration and consultation phase. The Dachverband Lehm has not yet been involved in these talks. We are nevertheless confident that earth building will be discussed into the expert committees

for the building and finishing trades. The procedure is expected to run until mid 2022.

The current status quo does not do justice to the growing need and increased demand for training and further education in earth building.

For the vocational and educational training sector, the DVL therefore developed a vocational qualification module<sup>2</sup> for earth building that can be integrated into the existing basic vocational training of relevant building trades. Individual Chambers of Crafts and Trades have already adopted this. In the field of vocational development for the existing building trades, two training courses have been established: the "Fachkraft Lehm (DVL)@" (Specialist for Building with Earth) and the "Gestalterin/Gestalter für Lehmputz (HWK)" (Clay Plaster Designer) by the European School of Earth Building. Those who successfully complete one of these courses may register as a self-employed tradesperson as per an exemption ruling in the Trades and Crafts Code (HWO §8).

For several years now, the Dachverband Lehm has been striving to have the "Fachkraft Lehm" course recognised as meeting the standard nationwide recommendations for vocational training examinations. The procedure is initiated by the Zentralverband des Deutschen Handwerks e.V. (ZDH, German Confederation of Skilled Crafts), which issues the recommendation and forwards it to all 55 Chambers of Crafts and Trades in Germany. A condition for this is that the course encompasses 200 hours of instruction.

01 Building the wall of an arcade passage on the roof of the Kasbah des Caids, Morocco





02 Plastering the “crenelations” with a fine-grain lime-earth plaster, Kasbah des Caid, Tamnougalt, Morocco

From 2021, the “Fachkraft Lehm-bau” meets this requirement and therefore complies with the German Qualification Framework Level 5 (DQR 5). Alongside the inclusion of new teaching content on sustainability analysis, combinations of natural building materials and business administration and marketing, the greater number of hours also contributes to quality assurance.

#### Looking towards Europe: subsidised internships abroad, also for tradespeople!

The need to strengthen the crafts and trades, and to counter the vocational drift towards academisation, has long been recognised but only recently addressed at a political level. Now, at last, this has been remedied through, among other things, the launch of a new funding programme intended to promote the incentive of training: ErasmusPlus. After decades in which students were able to travel to learn in another European country as part of their studies, vocational trainees can now do the same. During and up to one year after their training, they may work for 2-12 weeks in a cooperating European enterprise. As the support programme includes recognised further training in addition to basic training, it is therefore also open to all participants of the “FKL Specialist for Earth Building” (DVL) and the “Clay Plaster Designer” training courses. The internships abroad are individual grants which can be adapted to the traveller’s respective career and learning path for sustainable building. The European School of Earth Building in Wangelin, Germany, functions as the official sending organisation for the ErasmusPlus project, arranging placements in suitable companies and organisations in the field of

natural building techniques such as earth and straw bale construction, oven construction and monument preservation in other European countries.

Trainees receive a lump sum towards accommodation and travel expenses, which in many cases almost completely covers travel and accommodation costs. In addition, they receive free access to the *Online Linguistic Support* (OLS) tool, with which they can improve their language skills before and during their stay abroad.

The internship is certified by a Europass Mobility entry in the trainee’s Europass profile and an ECVET certificate can also be issued if required.

Even though it has been a long time coming, this project can be seen as a positive political signal towards countering excessive academic focus in the trades. In our context, it also represents a unique opportunity to look beyond one’s own horizons, freely and easily, within the framework of the “FKL Specialist for Earth Building” training course.

#### Earth building in academic education

##### Starting point

Today’s young architects, construction engineers and interior designers are increasingly confronted with a need for a more global perspective on and appreciation of traditional and modern building along with a more holistic consideration of construction methods. Good design and planning skills are just one aspect of this; organisational talent and the ability to work in an international team and in the context of foreign



03 Students demonstrating various earth building techniques as part of the 2nd Eco-Building Fest on the campus of Wismar University

cultures with foreign clients are another. Designers need to be familiar with the materials, their properties and how they can be worked in order to assess their relevance and appropriateness. In addition, they must also be able to find a common language when working and liaising with clients and contractors, representatives of the different trades, experts and laypeople.

As such, in addition to teaching professional skills and knowledge, university education should also assist in the development of students' competences.

Earth – as a very fault-tolerant and cost-effective material – offers an ideal starting point for this.

#### Problems and objectives

The personal experiences of the authors Wolff and Jörchel discussed here are mainly based on teaching at (Fach)Hochschulen (Universities of Applied Sciences), which have a stronger practical orientation and focus more on occupational fields than traditional universities, which are more theoretical and research oriented. This practical focus should be reflected in the teaching curricula. Unfortunately, this is not always the case.

As lecturers at various educational institutions, we increasingly see that many students, even those nearing the end of master's studies, are not able to recognise building defects, properly understand the

04 Self-produced adobe bricks on the test bench in the laboratory: Kompetenzzentrum Bau MV at Wismar University of Applied Sciences





05 International exchange during the joint construction of a simple building made of laterite bricks on the Agege Farm site in Ghana

sequence of construction tasks or their respective purpose and importance.

With Confucius' famous proverb in mind – *“Tell me, and I will forget. Show me, and I may remember. Involve me, and I will understand”* – the authors have endeavoured to introduce practical modules into the training of architects and engineers at higher education institutions and to create a suitable organisational framework within which this can take place. Currently, these are still optional electives, but the aim is that they will become a mandatory part of the study programme.

#### The “Get in touch” teaching concept

The teaching concept presented 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, if possible abroad.

In recent years the authors have run student workshops on sites in Tanzania, Morocco and Ghana as official cooperation projects. They are based on jointly developed building or rehabilitation concepts elaborated over the course of the seminar and involve working together and exchanging knowledge with experts and students in the respective country.<sup>3,4</sup>

Together with partners and partner institutions, an exchange between German students and students

from all over the world aims to strengthen their respective theoretical and practical competencies and at the same time promote the acquisition of soft skills.<sup>5</sup>

#### Results and conclusions

Soft skills refer to the social competencies of students and the schooling of behaviour and interaction. As has now been proven by scientific research, most students fail to realise their full potential (in studies and in later life) not as a result of limited intellectual capacity but as a product of ineffective interactions and communications, i.e. a lack of soft skills.<sup>6</sup>

To close the gap between theoretical knowledge and the lack of soft skills, the teaching concept presented here aims to strengthen the following key competencies, among others: communication and management skills, the ability to work in a team, but also to work independently, conflict tolerance and the ability to deal with conflict as well as a sense of responsibility and the capacity for (self-)reflection.

This requires teaching staff and personnel to acquire new or at least different skills in order to assist students in their personal development and personality. The establishment of special higher education institutions for didactics<sup>7</sup> shows that there is a growing need for continuing education formats and support to help university staff master the shift from traditional lecturer to supportive advisor.



06 International participants of the Singida Earth House Workshop in Tanzania (2016) explore different patterns of brickwork prior to final construction of walls (above) and the finished building (below).

The focus of the new modules is less on the final product than the process leading to it and the possibility to practice not just working methods but also organisational and interpersonal skills.

Sites should be chosen and organised in such a way that learning by trial and error is possible and that certain steps of the construction process can be repeated without impacting adversely on the budget or the schedule of the project.

Again, we consider earth to be by far the most appropriate material for this.

Another part of the teaching and learning concept presented here is to enable students to experience the joint project from different perspectives through a kind of role play, so that everyone can experience and understand the different hierarchies and levels of responsibility and authority. For example, one of the students can take on the role of the foreman, who answers to the construction site manager, who is likewise drawn from the pool of students. As a representative of the architecture office on site, he or she reports daily on the organisation of the construction site and the progress of the project. Similarly, the viewpoint of the client is also of interest.

In this approach, the role of the teacher shifts from that of a *lecturer* to that of an *advisor* accompanying his or her students.<sup>8</sup>

The transition from passive, dutiful student to active, questioning learner inevitably kindles a general thirst for knowledge and interaction that in recent years had seemed to have ebbed, possibly as a negative effect of the Bologna process and the switch from diploma to BA and MA degrees.

It is important to continue to implement this holistic approach to studying, and thus help to establish these teaching concepts in academic teaching.

## Endnotes

- 1 Study and examination regulations of the TU Berlin, Amtliches Mitteilungsblatt der Technischen Universität Berlin (AMBI)
- 2 Several vocational and educational training institutions already offer earth building modules in their curricula (level 1). In a project in 2008, the DVL accompanied the development of a nationwide qualification module "Construction of earth building structures" at the BE Knobelsdorff School in Berlin in accordance with BBiG. This module was tested and ratified in 2009 by the HWK Berlin according to the uniform national criteria set out by the Zentralstelle für Weiterbildung im Handwerk (ZWH). This means that this module can be carried out nationwide in the training of bricklayers. ([www.dachverband-lehm.de](http://www.dachverband-lehm.de))
- 3 [www.kasbah-des-caids.com](http://www.kasbah-des-caids.com) / [instagram](https://www.instagram.com/kasbahdescaids) / [facebook](https://www.facebook.com/kasbahdescaids)
- 4 [www.lake-agege-farm.org](http://www.lake-agege-farm.org)
- 5 CERKAS (Centre for Conservation and Restoration of Atlas and Subatlas Architectural Heritage), Quarzazate, Marokko; BRRI (Building and Road Research Institute), Kumasi, Ghana; NKA Foundation, Ghana
- 6 Hüttmann, A. (2016). Erfolgreich studieren mit Soft Skills, Wiesbaden.
- 7 See, for example, the Zentrum für Hochschuldidaktik und Erwachsenenbildung (The Centre for Higher and Adult Education), Pädagogische Hochschule Zürich.
- 8 Johner describes this paradigm shift as a change from the "push principle" of the lecturer to the "pull principle" of the student. Johner, R. (2011). Begleitung von Projekten im Hochschulstudium, in: Zwischen Beratern und Dozieren, Bern, p. 125

## Author biographies

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has been responsible for continuing education and project development and implementation at the Chamber of Crafts in Koblenz since 1999. She joined the board of the Dachverband Lehm e.V. in 2010 where, among other things, she leads the association's advisory boards for vocational training and the "Specialist for Earth Building" training course.

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