Knowing by site

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Joseph Rizzuto and **Indira Chauhan** explain that fostering positive relations between industry and academia can provide valuable learning opportunities for built environment students

At the University of West London (UWL), visits to construction sites form an important part of the student learning experience, because they help develop an understanding of how theoretical knowledge is applied in practice and provide an invaluable insight into industry practices and the work environment.

A site visit for students on built environment courses typically begins with a presentation from the site management team, with a health and safety site induction that is followed by a guided tour and commentary on the construction works in progress.

This article considers the relevance and scale of construction site visits on built environment courses, and how academics and industry support and organise them. Fostering links between the construction industry and academic institutions is essential, as allowing students to visit important construction works will inspire the next generation of professionals.

Students on built environment degrees are required to gain a good understanding of building construction methods and processes. In the first year of study on the BEng Civil and Environmental Engineering, BSc Construction Project Management, BSc Building Surveying and BSc Architectural Design and Technology, modules such as Building Technology, Building Materials, Civil Engineering Construction, Quantity Surveying and Civil Engineering Practice underpin the use of traditional building materials and the construction processes associated with them. These modules are significantly enhanced by well-organised site visits.

Scope and scale

The scale of the sites visited by UWL students varies in nature, and has included high-rise commercial buildings of concrete and steel-frame construction, excavations for foundations and piling, and complex demolition projects. Each visit is generally unique in nature, but all enable a better understanding of site operations. Staggered site visits at different phases of a project allow students to see the gradual progress of construction works.

On one visit, students were taken to a large residential apartment construction project on the waterside in west London when the ground works were in progress. The management team provided commentary on the initial site development activities, covering the site appraisal and in particular where the existing services were located. To avoid costly disruption and having to decommission these services, the team explained the challenges they would face and the methodology they would use.

During the site tour, students could see continuous flight auger-piling rigs in action and piles being cast. Students were subsequently invited to the next phase of the project some months later, where they saw the superstructure construction in progress and studied the project drawings, enabling them to relate to the site as well as the environmental constraints. The innovative responses that had been made to these constraints were highlighted by the site team.

On another site visit, the students saw how a self-contained formwork system of slip-forming was used to construct a reinforced-concrete lift shaft in a high-rise development. They watched the rising of the formwork at the steady rate of 300mm per hour that allowed for the continuous pouring of concrete,

UWL students after their tour of the site

UWL students reviewing project drawings before a site tour

demonstrating the differences between the use of slip-form techniques and the jump-form system that was covered in the classroom.

At a specialist demolition project, meanwhile, students were given an informative presentation by the project manager on the different demolition techniques available. The site was in a congested area of central London and surrounded by listed buildings, so the students were able to gain an appreciation of why specific demolition methods were chosen. The experience of observing actual demolition from a viewing platform reinforced their learning of demolition protocols.

By attending a range of site activities on projects of diverse scales, students are able to see construction works in progress, can understand factors such as environmental issues, or will experience, for example, the effective management of cranes adjacent to railway lines.

After each visit, a debriefing session is held back in the classroom in the form of a group discussion. This allows students to reflect on the various project processes, site constraints and approaches used. As part of the module assessment, students are required to write a reflective essay on their visit, highlighting any unique challenges and how these were managed.

A similar set of visits takes place in the second year of study at UWL, often to complex construction works, where students' increased knowledge and understanding allows greater appreciation of the techniques used.

Student perceptions

Construction videos and simulations give students a two-dimensional or three-dimensional experience of various processes. However, it is important to consider whether these provide the right stimulus for understanding the scale and impact on an actual site. A recent straw poll of a number of first-year students on the built environment courses at UWL suggested that site visits were a remarkable and distinctive experience that no classroom learning could replicate.

One student commented: "It is great to be able to ask the site team questions and get an insight into the complexities of project planning and management." Another student, who could see the benefits of exploring real projects in action, observed: "Sometimes, it is hard to imagine the dimensions and scale of work that takes place on construction sites. A visit enables a better visualisation of

how things actually work." Many students who have experienced virtual site visits and then compared these to actual visits indicated that the live sites provide a much more rewarding experience.

Many full-time students said that they had an unforgettable experience when they stepped the other side of the hoardings on their first site visit. The signage had an impact, and vividly reinforced the importance of health, safety and welfare on site. The site office environment and the variety of construction materials and processes used all contributed to this experience.

Part-time students on the courses shared similar views to their full-time peers on the importance of site visits as part of their learning on the construction-related modules. Planning constraints, materials and site traffic management, and use of specialist technology are some of the areas that these students valued the most.

Most students expressed a preference for visiting sites in groups of not more than six because it was then easier to shadow the person giving the tour while being able to hear what was being explained to them.

Constraints and challenges

Accommodating large class sizes on site visits poses a major challenge, as it requires the course leader to find appropriate sites with sufficiently large management teams. This often means groups are split, with possibly two or three senior managers involved in showing them around. This may be a deterrent for some project managers, as such visits invariably require more detailed organisation, additional resources and probable disruption to the works.

Other challenges include finding a steady supply of ongoing local construction projects that, ideally, tie in with the theoretical material being covered in the classroom. Sites located close to university premises are convenient as this means less travel time, minimising timetable disruption. Accessibility is often problematic, however, as many construction companies offer site visits to projects that can be located hundreds of miles away.

Professional bodies such as RICS, the Chartered Institute of Building and the Joint Board of Moderators (JBM) help with site visits for students on construction and engineering courses on a regular basis. These visits are open to students from all UK universities, but places are allocated on a first come, first served basis. The visits are organised with painstaking care taken by management teams to give an overview of the project and an explanation of the processes. Students from different year groups often take up such opportunities; unfortunately, due to the popularity of such visits, only limited numbers are able to do so.

Risks and hazards

Safety is a top priority while visiting sites, as construction activities are subject to a number of significant risks. These can be a result either of unique construction features with an unpredictable environment, or any complex processes being used. Although visits to construction sites are not prevented by health and safety legislation, it is essential to carry out risk assessments to ensure the safety of visitors – indeed, all those on site. Thus, all visits entail a risk assessment being completed by both the site team and the organising academic. As an essential part of this, all UWL students are fully equipped with the appropriate personal protective equipment, which fully complies with health and safety requirements.

Site teams are sometimes justifiably reluctant to allow visitors on to certain construction sites. This may be due to the specialised risks encountered, such as confined spaces or asbestos removal; work involving heavy plant movement or very high noise levels are other factors that restrict possible visits.

Outreach

In addition to the professional bodies mentioned above, many large construction companies have established links with academic institutions and are able to offer visits to readily accessible sites. The Industrial Advisory Boards and Industrial Consultative Committees at university schools or departments provide a platform to work with academics and offer project visits for students. For some companies, it is simply a case of finding and establishing the right contact in the academic institution to organise such visits.

All major contractors have corporate and social responsibility policies in place as part of corporate governance, and one of the core principles of these is to build relationships with communities. Encouraging site visits can provide the opportunity to enhance these relationships, so establishing and fostering good links between industry and academia is a way to ensure that a structured approach is taken.

Effective learning

A live construction site can engage students as active learners and have a long-lasting impact on how they learn. The effectiveness of site visits as a learning vehicle is enhanced when experienced professionals accompany students. Such professionals on UWL's Industrial Consultative Committee continue to support and organise site visits.

The learning opportunities provided by a live site can be enriching, particularly if several visits to the same project at different stages are possible. Along with site operations and project management practices, the complexities of a project and how it evolves over time will be seen.

Site visits also provide an excellent opportunity for construction companies to showcase what industry has to offer. They allow students to engage directly with the construction process and to speak to members of site and project teams. These experiences contribute to the development of more confident, work-ready graduates.

We, as the authors, would like to urge all chartered surveyors working on projects to reach out to local universities and help with site visits to projects that are near a university campus.

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JBM's Guidelines for Developing Degree and Further Learning Programmes
http://bit.ly/2Ba5kIL

Related competencies include
Construction technology and environmental services, Design economics and cost planning, Health and safety, Programming and planning, Team working