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Use of Industrial Simulation to Deliver Academic Knowledge, Vocational Knowledge and Vocational Skills.

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Educational wisdom believes knowledge gained through practical activity and personal research is often better retained. All the stakeholders to Building Surveying, (BS), education, (student, employer, RICS and university), prefer BS degree courses to provide academic and vocational knowledge plus vocational skills training. In simple terms graduates want to enter practice already able to undertake basic surveying tasks. This is a situation preferred by the RICS, and one often prized by employers, and therefore subsequently advocated by universities. Placement employers too are often looking for students arriving with practical skills and vocational knowledge. Every year it seems that those students who embraced the practical activities during the first two years of their studies find placements first, often with multiple offers.

With an academic course academic standards are set, as are the learning outcomes required from all levels of teaching. This means tutor control, needs to mirror that exercised in a classroom, wherever teaching takes place. Additionally students need to be equally well supported when learning moves outside of the classroom. Industrial simulation using an enquiry based learning pedagogy is practiced during some tuition for the BSc Building Surveying course at the University of Salford, (UoS). Industrial simulation is where an activity is designed. often with the support of an industrial partner, operating under industrial conditions. It requires the students to undertake tasks which simulate those undertaken by practice. Experience of running these activities over a couple of decades shows that the more realistic the simulation the better the levels of student engagement. The tutor needs to create control over the material studied. That can be exercised by creative brief writing. In building surveying terms this would be writing an instruction which requires the student in order to satisfy the instruction, to research material that would otherwise have been delivered by lecture, or requires them to develop practical skills based upon knowledge previously delivered to them.

An example of a simple BS simulation would sourcing an unoccupied domestic house, and asking students to undertake a building survey using an RICS template. This facilitates practical site surveying skills, basic pathology and report writing abilities. The tutor could then add a profile of the client raising the instruction. Now the activity no longer just requires the student to observe photograph and describe observations in professional language, but every observation needs to be evaluated and recorded in a way that focuses on the needs of that client. The tutor could add that the client is a supporter of energy efficiency measures, requiring students to research energy saving measures, renewable energy sources and assess their practicality to the property and

client's resources. The tutor could incorporate targeted building pathology by choosing a property salted with required defects instead of using a generic house. Additionally adding a desire to incorporate a loft conversion or extension brings in planning, building control, design, structural performance and CDM issues. Using a listed Victorian building located near water and trees brings in conservation, biodiversity, and possible environmental protection issues. Converting a ground floor room into a commercial therapy area brings in accessibility under the Equality Act 2010 and possibly the Enterprise Regulatory Reform Act 2013. By skilful manipulation of the brief a simple building survey can become the vehicle for any number of vocational skills and academic outcomes, in the building surveying domain. Some vital building surveying skills like project administration are quite difficult to simulate without being able to control a live construction project. Certain tasks within the contract administrators role such as site meetings, site inspections, application of contract terms to a given scenario can be simulated with industry support offering access to suitable sites.

The author only teaches practical building surveying modules. In the context of such teaching he believes that using a one dimensional tool like a written essay misses a trick. It is a perfectly good way of demonstrating academic outcomes, however it offers little by way of added value to the whole education experience. If the same evidence can be presented in an industry used report or document then completion of that document in an industry approved language adds extra value to the submission. Students engaging in completion of such submissions, have evidence of their skills in surveying to show to a prospective employer. Some of the outputs at UoS have been noted as being of better quality than commercially available. This is not because the students have better skills and knowledge, but they can spend expedientially more time completing the report than a practicing surveyor. Engaged students can access already good examples of practice reports and make them better. It is much easier to pair back excellent work to fit a commercial time frame than it is to bring work up to a commercially acceptable level.

A commonly used tool for commercial simulations run at UoS is preparation of a Scope of Works to procure remedial works for elements of disrepair noted during the surveying simulation. This requires description of disrepair, understanding of the causes of the deterioration, understanding of complimentary defects and an ability to select and describe suitable repair methods. It is an industry used document written using the industry accepted language. It requires a degree of knowledge of contract, and also introduces statutory obligation. Being written for a client, the profile of that client impacts on the replacement, repair or consolidation solution proposed, and for some clients, whether a disrepair appears at all. Submission is an essential part of the simulation. It maintains the realism, and becomes the point where the manipulation of the brief results in proven evidence of students meeting the required outcomes, both academic and vocational.

Taking learning outside of the classroom requires control of the learning material and support for the participants. The method of controlling learning material has been established, but if students are not supported adequately despite the vocational experience advantages, the possibility of individual disadvantage might render industrial simulation an unacceptable risk. This support is known in education as scaffolding, a term that describes a purpose surveyors particularly should understand. Anyone thinking of running industrial simulation or any form of site based activity needs to have the support methodology well established first. In lectures some students will play on their phones and not engage, and on site some students will not engage with the tasks set, though probably fewer on site than during a long lecture. Support needs to be there for those students who wish to engage, but find themselves confused, alienated or just too far outside their comfort zone. The support system for industrial simulation requires the following elements to be fit for purpose.

In a classroom the tutor is in visible control. In enquiry based learning the role changes to facilitator. If the tutor stays visibly in control the realism of the simulation can be diluted. The tutor must therefore adopt a role within the simulation which is discreet but be available to support students clearly struggling and be available to resolve any queries, steer learning and answer technical questions, i.e. a tutor must be present to step in if a student is operating equipment incorrectly. The tutor must also be visible enough to monitor health and safety issues. It is the experience of the author that support requirements diminish as the simulation progresses and the role adopted needs to allow for this. Successful support requires students to arrive on site with all the knowledge required to perform the tasks. Identification of that knowledge imparted through lecture or self-preparation is essential. A student told as part of the simulation that they are a newly graduated surveyor will not engage unless they feel prepared to simulate that role. Preparation is core to the success of industrial simulation.

In site based activity health and safety is paramount. At UoS all BS students before going on site receive a copy of the same method statement template used by a large practice, completed by them before any of their surveyors enter a site. This reinforces both health and safety issues and realism, as it is a genuine industry used document.

The author hopes this article recommends the advantages of the use of industrial simulation through an enquiry based learning pedagogy. It should be noted however that whilst its advantages in terms of vocational skills practice and direct application of vocational knowledge are significant, it needs to be

creatively designed, meticulously planned and rigorously supported, if it is to be successful.