



DIGITAL FUTURE

SAMSUNG

Digital technology may be finding its place in certain parts of the construction industry, but for many, a fundamental change in mindset is needed before the benefits can be fully realised. **Helena Russell** reports on two initiatives that are intended to help the industry modernise - rather than let it die

Skills shortages at many levels, and a poor appetite for digital technology, were just two of the shortcomings specific to the construction industry that were highlighted in the hard-hitting *Farmer Review*, published three years ago.

The report into the industry's labour model was a no-nonsense wake-up call and urged radical action, with its stark tagline of 'modernise or die'.

Author Mark Farmer (pictured right) – CEO of consultancy Cast – warned that within a decade the available labour force could decline by up to 25% due to the ageing workforce and dwindling recruitment. He specifically called on the Construction Industry Training Board (CITB) to focus on the skills that a modernised industry would need.

Three years on, Farmer says that he is 'broadly happy' with the response to his review, but cautions that even in that period, the rate of change in technology has accelerated even further, and it is easy for companies to feel overwhelmed. "The industry at the moment has the look of a rabbit in the headlights," he says. "There is so much choice out there, but not a great deal that addresses a specific need."

This creates a vicious circle when companies invest in new technology, but then find it does not do what they were led to believe it would. "People get frustrated and cynical, and end up sticking with their analogue methods," he says.

Much of the progress until recently has been in architecture and design, and the introduction of digital technology on construction sites is a positive sign, he believes. "But there is a risk that those at the top don't understand the benefits that the technology can deliver; we need senior leaders in business to become more aware of what is available and how it can help them."

CITB's report *Evolution or revolution?* published in March this year found that as a less-automated sector, construction stands to gain much more from modernisation than other parts of the economy. Hence the charity is investing heavily to encourage the industry to deliver the skills that are needed.

The rate of change in technology has accelerated considerably in recent years, and there is a risk that companies can become overwhelmed by the range of products on offer



Seven projects to develop immersive learning tools have been under way since 2018 and are being funded to the tune of £3.3m. And in October this year, a further £2.35m initiative was launched with the aim of equipping leaders with digital knowledge and digital skills.

"There's a recognition that construction is relatively poor in terms of the number of processes that have been digitalised," says CITB's head of future skills & leadership, Marcus Bennett. While construction might understandably lag behind sectors such as information technology, professional services, and banking, it ought to be on a par with industries such as oil and gas, utilities and manufacturing – yet it is not.

There are a number of ways in which CITB is trying to take a lead. "One is helping the industry to digitalise itself. Another is using new technologies; in relation to immersive learning, there are lots of opportunities to deliver training in different ways that have a number of benefits," Bennett explains.

"For example you can do your safety training, or your induction, or your site familiarity training in a safer, virtual world, you can save time and you can do it without impinging on the actual construction site," he explains.

The use of handheld devices that interact with the virtual world enables people to be trained in using equipment, tools or plant to a certain level of proficiency before being allowed to use it for real, and that eliminates the risk of injury and reduces the cost of the training, argues Bennett.

"It also changes the way that construction is perceived. We are competing with many other industries for the attention of a digitally-native, younger [audience]. If we are using immersive learning, they will see something that is recognisable to them and it makes us look like a more appealing industry."

Digital simulators are relatively commonplace in some parts of the industry, he says, highlighting the trial that is currently taking place at the National Construction College where plant simulators are being used to train operators before they are allowed to use the actual equipment.

The CITB's 'immersive learning commission' is currently supporting seven projects – six of which involve developing and piloting immersive learning in different training environments.

One crucial point, says Bennett, is that CITB will own the intellectual property rights for all the training materials and processes developed in the funded projects, and these will be made available to anyone who wants to have them.

The projects range from new ways of educating students in higher and further education, to the use of immersive learning to deliver very specific training, such as inspection with drones, in construction industry hubs around the country.





The immersive learning tools developed at City College Plymouth are being rolled out in their final form this term

Others are schemes led by contractors looking to create site-specific training and induction modules in a virtual environment to reduce cost and eliminate risk on their sites.

This term, City College Plymouth will be rolling out the final part of its CITB-funded immersive learning initiative to construction students in higher and further education. It will be the first time students will have used the new learning tools on these courses, and the work will carry 25% of their final mark.

Lance Chatfield, the college's academy manager

for higher technology skills, explains that he was already thinking about how City College Plymouth could benefit from new technology such as immersive learning when the commission came to his notice:

"I had been doing some reading into how 'generation alpha' students learn, and considering how we could apply it to our teaching," he recalls. "Generally these students don't benefit from a traditional learning environment, with a teacher standing up at the front of the class and presenting things to them," he says.

City College Plymouth's bid for £270,000 funding was successful, and the scheme, which is now entering the final stage, includes partners Plymouth Construction Training Group, Kier Living, Willmott Dixon and Building Plymouth as well as property developer The Movement.

The tool uses a high-quality digital asset of a virtual house and building site as the basis for a range of learning activities, with the aim of reducing the learning hours for students, as well as increasing their retention of information.

The digital model was created early in the project and was followed by development of safety-training modules for further and higher education courses in the construction industry.

Students can be trained to recognise plant and equipment hazards during construction; learn how to work safely at height, and about electrical and fire hazards in completed buildings. Higher education students will be invited to roam independently around the digital model, assessing any dangers before compiling a risk assessment and method statement for the site, as part of their coursework.

Evaluation of the new learning tools will be carried out both by the CITB using an external evaluator, and by the college itself, which will compare this year's results with last year's. The college also surveys all students who go through the course to gather specific feedback.

Outside of the more obvious learning outcomes for students, the programme also supports blended learning, including virtual reality (VR), for training construction managers and supervisors, as well as training to upskill college staff and local employers in how to adopt and embed immersive learning in their own environments.

But as Chatfield explains, the project looks likely to have a much wider impact than he had anticipated: "When we began to test the initial product on our higher education students, they started to identify other ways it could be used. For example some thought that their senior managers should use it – those people who might have had health and safety training years ago and not had any refresher training since."

While the exploitation of digital technologies in the training environment has obvious advantages, the issue of competency among leaders and managers has also been identified as a barrier to digital adoption. The greatest inhibiting factors are behavioural and cultural, rather than technological, says Bennett.

"A year ago CITB published *Unlocking construction's digital future*, which concluded that the key is to encourage people in positions of influence to have a flexible mindset," he explains. "They need to develop 'soft skills', or microcompetencies, which equip them with a creative, problem-solving attitude, and with the communications skills to be able to inspire other people".

The report was rather negative about the quality of leadership in the sector, Bennett admits, but claims this is largely down to the way the industry works – the big, innovative organisations depend on the supply chain, and these tend to be SMEs which in turn employ micro-companies.

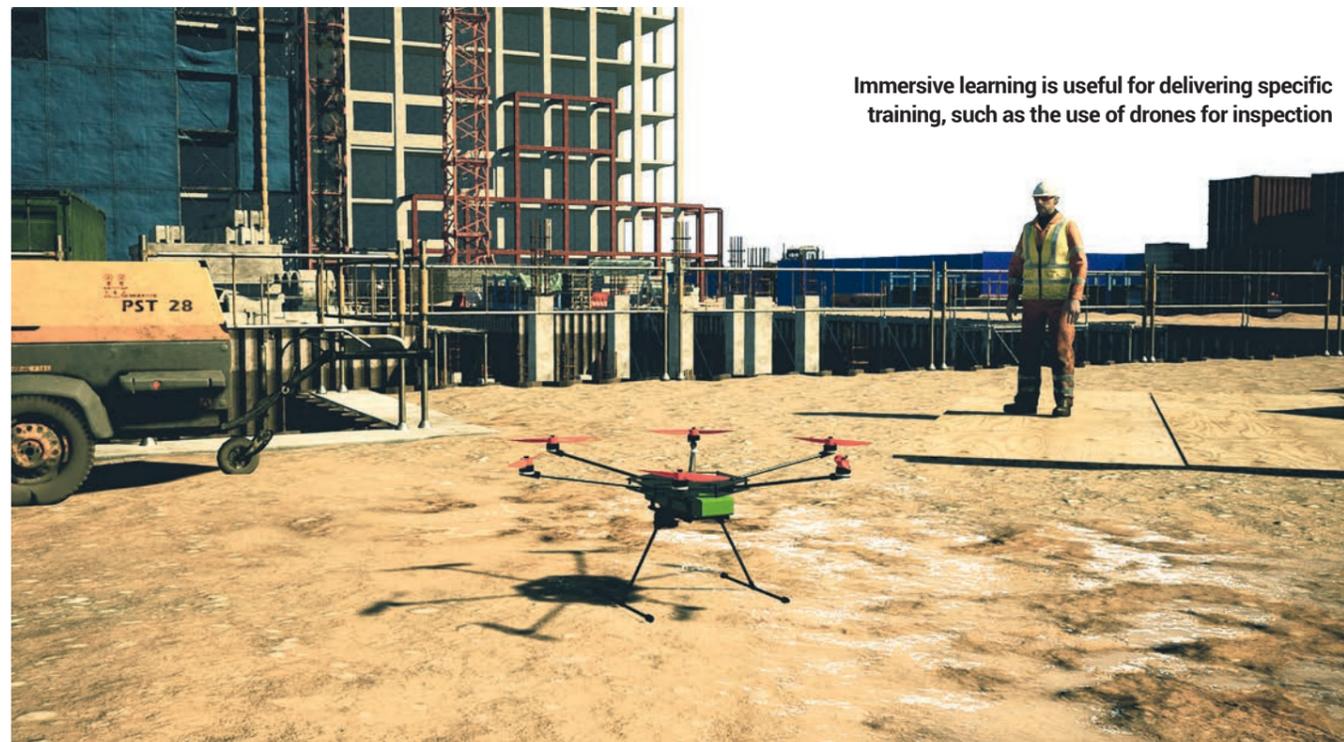
"There is also a separate issue around understanding tools and data – not knowing what technology is available, and not understanding at what point in a process you might use technology as a solution to a problem," he says.



Students can be educated about site safety using immersive learning tools in the classroom



The digital model that City College Plymouth is using is a replica of an actual construction site in the area



Immersive learning is useful for delivering specific training, such as the use of drones for inspection

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The first phase in CITB's digital leadership initiative, which was launched in October, funds six schemes to develop solutions to individual issues at senior management level. These range from Willmott Dixon's project to introduce distributed ledger technology (which employs blockchain technology and saves costs by cutting fraud and reducing error) to the scheme being led by Gloucestershire Training Group where workshops and direct support will help SME leaders to increase their productivity by identifying digital solutions for repetitive, time-consuming processes.

One scheme plans to draw directly on the experience of large infrastructure contractors in implementing change in their own organisations. Ian Heptonstall, director of the CITB-funded Supply Chain Sustainability School, explains that one of the difficulties these large organisations face is how to trickle down knowledge and training to the supply chain.

"No matter how skilled these contractors might be in using digital technology in their own processes, if their suppliers aren't also using it, then there is no way that they are going to be able to reach their targets for building leaner, greener and so on," he says.

The Supply Chain Sustainability School works with 87 different organisations to develop and deliver training to their suppliers via an online school; around 70% are SMEs. Training is funded by the member organisations and delivered free at point of use to the suppliers.

"We particularly want to help SMEs to understand the benefits that digital working can offer them, and what they need to do to embed it in their practice," says Heptonstall.



Dangerous activities such as working at height, or underground, can be taught without exposing students to unnecessary risks

The school has partnered with Tideway, Skanska and Costain – considered to be exemplars of digital working – to tap into their experience and identify successful initiatives. "We will take the learning from this and use it to develop e-training courses and other resources that can teach digital leadership skills in a digital environment," Heptonstall explains. "Of course we will also want to know the things that didn't work."

Dale Turner, Skanska's director of procurement & supply chain, says that the company spends around 80% of its revenue with the supply chain. "Digital leadership from our suppliers and subcontractors will help increase productivity on our projects," he says. "These resources will be free for our supply chain to access, to help them learn additional skills in this area."

The second phase of the work will be to engage with SMEs to encourage them to register for the digital leadership e-learning programme – and Heptonstall acknowledges the irony of the fact that this will start off in the physical environment via a series of 'digital days'.

"We have got to get these people together physically in the first instance, to get them to understand the potential of digital, and how they can develop their digital leadership skills to drive change," he says. The 'digital days' are also intended to act as a kind of market place, where attendees can try out new technologies and learn about digital processes. These will be followed by a series of face-to-face workshops with individuals.

Tools for measuring the 'digital maturity' of companies and individuals will be developed, so that training needs can be assessed and delivered. As more people participate, individuals will be able to benchmark themselves against others in the same sector, and easily measure and prove their progress.

Heptonstall also suggests that the system will make it easier for suppliers to prove the digital maturity of their companies to new clients – in the current system they have to provide evidence to each new customer on request, and there is no standard assessment procedure.

The intention is to create an online questionnaire that a supplier will complete, and will be able to make available to any potential customer – and this will be updated as any staff registered to that corporate account successfully complete training modules. ■

