BIM Leaders of the Future: Engaging the Digital Generation

Introduction

"Education, in a way, dislocates very many people from their natural talents. And human resources are like natural resources; they're often buried deep. You have to go looking for them, they're not just lying around on the surface. You have to create the circumstances where they show themselves..."

Extract from "Bring on the learning revolution", Sir Ken Robinson, TED2010

Children of the 21st century are digital natives. It's a term that's used to describe your average teenager, who, born into the digital age, has an expectation to be constantly connected.

Their everyday lives are planned on Snapchat and posted on Instagram. Long gone is the phone for talking to people. No, the phone is a digital collaboration tool. Why talk to one when you can message ten of your friends at the same time? How bizarre that you would choose a one to one over a one to ten. Children collaborate. Except they don't call it collaborating. They don't call it anything really - it's a natural way of behaving to most.

So, all the hype about collaboration being critical for a successful construction industry is a little strange to most kids. "What, you mean they don't work together already?"

And if you want to inspire the next generation to join your team, you should think twice about presenting your best drawings and rolling them out across the table. Scrunched up noses, raised eyebrows, frowns...that's before you even start talking.

In truth, the Construction Industry has a far greater problem to deal with than BIM adoption. With so few young people coming through to our great industry, it's the future of our workforce that we should all be deeply worried about.

Practically every day, the media screams of skills gaps, gender issues, poor careers advice and failing apprenticeship programmes and what's more, industry screams right back with "We're doing loads of stuff to get young people interested in our sector. What more can we do?!"

How the so called 'skills gap' situation has been allowed to get so bad is beyond belief. No one saw it coming? Really? As a child, I was reasonably bright with a stonemason for a father. Everyday he worked on building sites and yet I don't recall a time when he sat me down and said "Tonight we're going to talk about abutments, aggregates and architraves, as I see a bright future for you in construction." Girls didn't have those conversations. I'm not even sure that boys did, unless they were going to follow in Dad's footsteps.
At school, the building trade was only for boys of 'lower academic ability'. Not a lot has changed there, then. The really bright ones went on to study law, finance and medicine, just like they do now.

The skills gaps was emerging, and we did nothing about it then, and seem to be doing very little that is truly effective now. That gap has since become a national crisis.

When the British Construction Industry is experiencing one of its most exciting times given the use of incredible technology and demonstrable global leadership in BIM, it should be at the top of young people's lists as a career destination, and yet, we have never experienced a more miserable time when it comes to attracting fresh, young talent.

We have to think longer term. In the words of the famous phrase "Never let a good crisis go to waste", we should be looking to change our existing behaviour and the image we have long portrayed, rather than trying to quick fix the situation with a little government scheme here and a new careers website there.
Time flies: how five years can make all the difference

In October 2010, 13 year old Accrington schoolboy Dan Rollings volunteered to try a new scheme to introduce technical and professional construction careers in schools. He didn't know anything about the construction industry, and took part because it meant he could skip a few Games lessons.

The 'Class Of Your Own' scheme was developed to prove that young people could collaboratively design, engineer and construct a small building using industry standard BIM software. With support from some really enthusiastic local professionals, Dan worked with some of his classmates to model the very first Eco Classroom using Autodesk Revit, and the rest is history. The Accrington Academy Eco Classroom won an international design award which took Dan and his friends to San Jose, California, and they returned to apply for planning permission, which was granted. Had it not been for losing the opportunity to be considered for public funding, the school would have built the project.

Dan's love of buildings never wavered. He progressed his design skills, and now, at 18 years old, he has a conditional offer to study Civil and Structural Engineering at the University of Sheffield.

Around the same time in 2010, the Government Chief Construction Adviser, Paul Morrell, in an effort to cut construction waste, publicly advocated the use of BIM where all parties working on public sector projects shared 3D design information. They were to collaborate. The Government Construction Strategy, published in May 2011, went on to state that the '...Government will require fully collaborative 3D BIM as a minimum by 2016'.

As for the children at Accrington? They were already working together in 3D. They queried the need for rules and regulations to 'make' people do it.

"We live in a 3D world, so why would you design in 2D? And why don't people share information? That's just stupid.".

So here we are. One year away from the golden year, and the NBS National BIM Survey 2014 results showed BIM adoption was accelerating. 54% of respondents said they had used BIM on at least one project in 2014, up 15% on the previous year. In 2010 only 13% of respondents were using BIM and 43% were entirely unaware.

Perhaps it's time to get back to basics. Perhaps we're trying too hard and can't see the wood for the trees? While we're investing in BIM as an industry, we should surely invest in teaching for a modern built environment? I'm not suggesting that every child emerges from secondary school spouting PAS 1192, but certainly we could take better advantage of young people's digital, collaborative skills that we're so lacking in the real world of work.
The Challenges in Engaging the Digital Generation

“The future depends on what you do today.”

Mahatma Gandhi

A captivated audience of 13 year olds stood watching a video of some stunning architectural visualisations on YouTube as part of a school Options Evening presentation. Parents were equally enthralled, staring at the screen with expressions ranging from awe to bewilderment, and thoughts of "My goodness, can this be construction?!" running through their minds.

The silence was broken by one mother, asking:

“So, is this a Level 2 or a GCSE qualification?”

When told it was officially a Level 2, but included as one of the government's new equivalent vocational qualifications, she promptly took her son by the shoulders, said, "Thank you, we're not interested, then", and marched him out of the classroom, much to the clear disappointment of her child.

This parent's lack of understanding of the current political landscape in terms of vocational and academic qualifications is by no means unusual, and in fact, a major challenge for industry. So many changes have taken place in the past few years that parents, and educators, can be forgiven for thinking that anything 'vocational' applies to trades and crafts. Bearing in mind that teachers need a degree to teach, they have little understanding of alternative routes into professions.

Google the words "vocational qualification" and a range of results are thrown back, including:

"What is a Vocational Qualification? These qualifications are all about the world of work, across the full range of jobs, industries and professions. They are all the qualifications that are not GCSEs and A levels (GCEs) which are known as academic or general qualifications."

The Accredited Qualifications website displays a picture of a hard hat as soon as you land on it, and opens with: "Vocational qualifications refer to work-related qualifications. They are designed to enable the learner to acquire knowledge and skills that are required by the national occupational standards (NOS) to be able to perform a particular job."

To the average parents, University does not spring to mind when 'work related' is in the jargon. 'Work' is about employment and ultimately financial gain; something one does after University, not before. Those parents and teachers who believe their children/students may not make the grade for University, often incorrectly deemed to be low(er) achievers, may well encourage their offspring down the vocational qualification route as they see them in a job as soon as they leave school, perhaps via an Apprenticeship...

Carry on Googling, this time looking at the word 'apprentice', and you get this from the Oxford Dictionary website:

"A person who is learning a trade from a skilled employer, having agreed to work for a fixed period at low wages."

Example: an apprentice electrician, an apprentice barman.

The Concise Oxford Dictionary (a trusty Ninth edition, published 1996 and 'the foremost authority on current English') provides examples: 'apprenticed to a builder, apprenticed to a hairdresser'.

All the above are honourable trades, but again, you can forgive parents and teachers who steer their gifted and talented high achievers to take the degree option and ignore these new fangled higher apprenticeships.

The unappealing, low level perception of the vocational qualification, coupled with that of the Construction industry, makes it a ginormous challenge to bridge the skills gap. Only last year, a survey by educational organisation the Edge Foundation, found that youngsters were being actively discouraged from opting for vocational education by parents and teachers, who regarded them as ‘too clever’ to pursue a career in construction.

Paul Sperring, Associate Director at Mott MacDonald knows that thousands of students graduate with engineering degrees each year, but finding apprentices and graduates to work in the building services sector is challenging. "Part of the reason is that the majority of the population don’t know what building services engineers do. This includes teachers, parents, careers advisers, and engineering graduates. Great buildings are designed by great teams of people, and those teams include professional engineers.'

Professional bodies and membership organisations are trying hard to rebrand construction and engineering through major campaigns, but all the PR and marketing in the world will not help to educate parents and educators unless a campaign is in conjunction with, and clearly supported by, leading government figures, especially those in the Department for Education.

Are the politicians really listening? With a pending general election, one would hope so, but industry leaders could do more to ensure that the message being delivered in the Department for Business, Innovation and Skills is also being heard around the corner in Sanctuary Gardens, the home of the DfE. Nicky Morgan, Secretary of State for Education, is recently quoted as saying:

"At the heart of the failures in our education system was one simple fact - this country was failing in its duty to nurture every young person’s unique talents - of letting too many future Stephen Hawkings, Mary Beards or Tim Berners-Lees leave education without realising their potential."

Who knows, the young boy who was ushered out of the classroom at Options Evening may well have gone on to be the next Isambard Kingdom Brunel. We shall never know unless his mother hears, from Nicky Morgan herself, that the DfE's qualification reforms aim to better prepare pupils for life after school, and that she can be assured that a Level 2 qualification that appears on her 'high quality list' is one in which she, and her son, can have great faith.

The DfE's website introduces qualifications designed with, or approved by, employers which lead to "some of the fastest-growing and most rewarding jobs of the future".

"For example", it quotes, "Someone interested in construction could, between the ages of 14 and 16, alongside their GCSEs, take a certificate in designing, engineering and constructing a sustainable built environment."

Heartening news that 'high standard, high value' Level 2 qualifications are included in 'Progress 8' measures in secondary education, and perhaps news of degree apprenticeships will also help to bring the vocational and academic battle to a close, particularly when they include chartered surveying, digital technologies and construction.

Before you get all excited that a brand new, genuine industry derived curriculum has finally cut the mustard, and that apprenticeships may be getting the recognition they deserve, there is still much work to do.

As BIS launches the Digital Built Britain strategic plan with an inspiring introduction...
The UK has the potential to lead one of the defining developments of the 21st century, which will enable the country to capture not only all of the inherent value in our built assets, but also the data to create a digital and smart city economy to transform the lives of all.

...so too does the Digital Skills Committee, led by the Head of Ofqual, Baroness Sally Morgan. Entitled "Make or Break: The UK's a Digital Future", it has similar motivations...

The introduction reads:

"Digital technology will challenge traditional methods of delivering education, meaning schools and teachers will have to adapt. New models of learning - such as increased online learning and employer-designed short courses - need to keep pace with evolving technology and digital change. Changing demands from firms, consumers, students and communities mean that apprenticeships, vocational qualifications and degrees need to deliver more general - and also specific - digital capabilities. Adults need more opportunities to learn throughout their lives to adjust to a world changing in ways as yet unknown. Education needs a greater emphasis on providing every citizen with adaptable digital skills."

Transformation. There's so much to look forward to if you have the infrastructure in place to deliver.

Here is where industry and education are poles apart. BIM is not about software, but most organisations know that they're going to need to crank up their technology if they're still using that old kit that runs Autocad LT. Whereas education is investing in programmes of study to develop coding and computer science and spending significant sums on Raspberry Pi kits, 3d printers and tablet computers, the heavy hardware needed to run anything more than a game or simple app is taking a back seat. As such, countless design technology departments (where anything remotely design and engineering based is taught) across the country are reliant on the goodwill of teachers and technicians bringing in their own laptops from home, or indeed using the one of the only higher end (and this is an overstatement) laptops in the entire school to print that 3d chess piece or access Google Earth.

One of the recommendations states:

"New and existing teaching staff need significant contact with industry to see the latest technologies in action and subsequently pass such knowledge."

No matter how significant the contact, it's hard to pass on knowledge without the most simple of technologies - a half decent computer. When many of our tech savvy youngsters have better computers at home than they encounter in school, Government must provide guidance and financial support for schools to ensure they invest in the right tools for the job. There is something about the 'one size fits all' procurement process that has very little synergy with the aspirations of the Digital Skills Committee. One school would not have had the technological ability to run the Design Engineer Construct! programme, despite being hot on the subject of architecture, if they hadn't been in the right place at the right time when Costain were disposing of their redundant laptops. We shouldn't have to rely on hand-me-downs, but then again, this second hand kit was better than anything in school. Shameful? Maybe.
In Conclusion: Less is More

"If you make listening and observation your occupation, you will gain much more than you can by talk."

Robert Baden-Powell

As a justifiably proud industry, we have some unbelievable projects to show our young people just how great British construction and engineering can be. The trouble is, we can roll out Crossrail as many times as we like, but your average 12 year old isn't so impressed.

"It looks cold and damp."
"It's dirty."
"It looks like loads of people just stand around all day."
"It looks like a boring job."
"It's not for girls."
"Going down the creepy tunnel in the dark would be cool!"

Perhaps this is not the response we'd hope for, but that last statement says everything. Let's remember, secondary school children are exactly that. Children thrive when they can use their imagination and it's up to us to fire it up. If we want school children to put our industry at the top of their lists, we need to think like them, and get creative. That way, Construction becomes fun and exciting and before you know it, digital construction starts trending in the classroom, as well as on Twitter.

It's very difficult to offer constructive criticism to industry practice in schools where student engagement is concerned. There must be thousands of ambassadors around the country, and many of these dedicated, passionate people have the full blessing of their companies to take as many as six days off work to engage in school and community focused activities. This is fantastic on the face of it, but as business starts to boom again, and that project needs completing or that tender deadline looms closer, this is sometimes a big ask of staff. When employees are so committed to the job in hand, one could argue that it may actually put unreasonable pressure on those same individuals.

My suggestion that a deeper understanding of the industry on the part of young people may actually come from doing less may well seem like a strange approach - after all, it looks pretty good to have ticks against the large numbers on your Corporate Social Responsibility or National Skills Academy report - but what have you actually achieved? Practically every medium/large built environment organisation, and an awful lot of small ones too, engage hundreds and hundreds of school children throughout the country in careers talks, STEM fairs and mock interviews. There are few children given the opportunity to go to school the next day and say to their teacher, "So Mr Jones, let's pick up where we left off yesterday and continue the discussion around building services engineering and carbon reduction..."

Imagine what might happen if they could...

If a regional office of each and every one of those organisations fully integrated with just one school each, honing their efforts on their teachers, then together - collaboratively - we will create a nation of attentive, confident, excited, reenergised educators, not to mention students.
The reader should be in no doubt that developing long standing relationships with schools, especially those in challenging and deprived areas, can significantly raise children’s aspirations. Take Clacton Coastal Academy, serving the Jaywick community amongst others. Jaywick didn’t have gas, electricity or even a sewerage system until the 1990s. "It’s moved on," says Head Teacher, Tracey Hemming, "But we’ve got a whole area in Britain of deep deprivation and deep poverty." This social decline is mirrored in Clacton’s dilapidated housing, and the sobering facts that 54% of its population are on benefits, and 33% are unemployed.

However, the Royal Institution of Chartered Surveyors has brought tangible benefits to Clacton Coastal's students. "Spending time with professionals opened up their eyes to the many opportunities in construction and engineering," continues Mrs Hemming. "It moved them away from the celebrity culture and pie-in-the-sky aspirations."

It's not rocket science. It's opening up to the suggestion that the great stuff you have been doing for the last twenty years may just need a new direction. That together is better. You'll still win bids, even if it appears your doing the same as everyone else, including those you are competing with for that aforementioned tender. And why will you win? Because you are also now striving to be the best to demonstrate the social value you bring to a project. Your sustainability and CSR policies are returning tangible results with evidence of delivery - not just in young people achieving useful qualifications, but also in improvements in social standing, confidence, self esteem and happiness. Yes, happiness. A visit to the classrooms where those high standard, high quality qualifications are being taught undoubtedly leave ambassadors with a smile on their faces. They are happy places, buzzing with activity, especially when someone from industry is not only supporting delivery of a Level 2 unit, but breathing life into it.

Indeed, the personal reward of focusing on the one school, rather than the many, is great. Not only a feeling of intense empowerment, knowing that those young people are really learning from what you say and do, but also the immense satisfaction that the teachers in your school are passing on a genuine working knowledge to their students. Those students then pass this onto their parents, and suddenly the dinner table talk is of the great structures they have learned about, their aspirations for a career in the industry, and

"Mum, did you know that the slope of a roof can be calculated using Pythagoras theorem?"

By adopting a school as your own, you have done a truly remarkable thing. You have connected with young people, they know you're going to return, and suddenly, they are thriving.

Thanks to you, the Construction Industry is winning the battle and forging the strongest of bonds with education. In just a few short years, that teenage talent you supported is landing on your doorstep with a CV to be proud of. Better still, they are instantly employable, and you know this for a fact. Why?

Because you moulded them to be work ready. You shaped them to be what they have become.

They are the BIM Leaders of the future, thanks to you.

Five things to do today if you want change the future:

1. Encourage your boss to Adopt a School. And if you are the boss, do it anyway, and give you and your staff a break.
2. Call some of your competitors. Encourage them to do the same.
3. Visit a school that is doing well with vocational programmes. There's nothing more inspiring than spending time in a lesson with the next generation of AEC professionals. Encourage the
school to invite some parents along at the same time, and talk to them about their hopes for their children.

4. Send an invitation to your local MP to observe the impressive progress of children undertaking these technical vocational programmes of study and ask them to stay longer than the obligatory 15 minutes.

5. Feel good about what you stand for and what you do. And give yourself a pat on the back for doing it.

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