

Immersive Learning 2019 to 2021

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Project summary

In 2018, the site induction on one of BAM Nuttall's highways project was completely redesigned to streamline the process and improve engagement for learners. Instead of using PowerPoint to present to the inductees, a series of subject boards were placed around the induction room.

To encourage discussion, interaction and improve engagement, the induction facilitator led inductees around the room using the boards as a prompt for discussion. To provide added context, a large floor map showing an aerial view of the site formed a key talking point to explain where important facilities, such as welfare, emergency muster points etc, are located.

Further, relevant objects such as multi-coloured cones were used to help communicate the different roles the colours play, along with mannequins wearing standard seasonal PPE.

In 2019, using CITB funding, we took this process one step further to gain greater engagement and knowledge retention. We achieved this by digitising and gamifying some of the discussion topics, including Augmented Reality information and introducing new content that is normally impractical to make available in a classroom.

Each inductee is provided with a tablet to follow the process, with the facilitator having their own tablet thereby enabling them to track and see how everyone is doing in the process. The use of the tablets complements and blends existing behavioural induction training with new immersive learning content which helps to enthuse the industry by engaging workers, reducing induction time, improve memory retention and behaviour

Alongside the classroom content, we deployed a freely available take away mobile app plus a Virtual Reality game. The aim of the VR game is encourage school leavers into the construction industry by showing that engineering and construction skills can be interesting, challenging and fun. The team-based game will be used at careers fairs and for general outreach.

Recommendations

Recommendations to share with industry for future immersive projects:

- Ensure the right people and experts are involved with the project. People who can see and support the vision and spare their valuable time to commit and invest in the project
- Have plenty of end-user sessions to gain both positive and negative feedback on the product
- Encourage open and honest conversations
- Share best practice
- Prepare for the unexpected – pandemics, restrictions on travel
- Showcase and promote the product
- Maintain contact with CITB and prepare to provide updates

Introduction

Inducting workers on to highway construction sites can be time consuming and repetitive for those who work for short periods on multiple sites. Attention and engagement levels are therefore low with language often a barrier to non-native English speakers.

The objective was to blend existing behavioural induction training for up to twenty people with new immersive learning content. We aimed to enthuse industry through engagement of workers whilst reducing induction time, improve memory retention and onsite behaviours.

As the project lead, I brought together a group of people to assist with the development of the appropriate material. The working group consisted of health and safety specialists, training managers, project managers, and end user testing. As a working group, we met regularly to assess what the best topics were to gamify, talk about next steps, and promote ideas and different thinking.

We used 360° photos and videos which were captured on a live site to provide real-world scenarios and reference materials to associate with the learning, with each section being designed around a specific scenario.

The Interactive 3D gamified components challenged learners to apply their learning and understanding via a simple single interaction, or via a series of interactions as the complexity increased, to replicate real world procedures or processes they would be expected to follow onsite, providing score and feedback based upon their performance accordingly.

Augmented Reality (AR) components were added to the blended classroom learning experience, with learners using Android Tablets to immerse themselves into a scenario, to think about their immediate situation whilst also being aware of the overall construction deployment area. In addition, a free mobile application was created to allow learners to take-away materials and access refresher challenges.

The induction was designed to include 3D content, serious games and interactive quizzes which cover behavioural induction topics across a range of themes - Access & Egress, Exclusion Zones, People Plant, Safe Lifting and Excavation. In addition to this, the learning is available in four different languages – English, Punjabi, Romanian and Polish.

The tablets were ready to be deployed in February 2020 and were used for a short time before the Covid-19 pandemic prevented us from using the tablets for some time. Since then, a work around has been put in place so that the tablets are wiped clean after use and the use of the tablets can easily enable the inductees to practise safe distancing.

The aims and objectives of the project

The way site inductions were delivered had not changed in a long time and most are delivered using PowerPoint to a room of people sat down. Having witnessed many of these induction sessions, it was apparent that audience engagement was low. The inductions are generally delivered early in the morning, people may have travelled many miles to get to site and the subject is one that most people will have covered many times before.

The new style of site induction meant people were stood up and interacting with the facilitator and each other and sharing their own good and bad stories of health and safety on site. Adding in tablets as a way of delivering site inductions introduced an even more engaging experience.

Summary of the Budget and funding sources

The total project budget was approx. £346,000, made up of £102k match funding and £244k grant funding from CITB.

Our Approach

A working group consisting of project lead, health and safety managers, project managers and the digital creation company was formed. To kick-off the project, we held a series of workshops so the project team could gain a deep understand of the challenges, barriers to learning and decide which topics should be covered. By involving a number of Subject Matter Experts, we were able to gain valuable insight and refine the overall concept for how the software and content should be formed.

Our technical partners Make Real, took us through a learning design process where the learning objectives were mapped out to a storyboard. Along with the storyboard, they undertook a game design process to devise and design a series of serious games to ensure the eventual content met the learning objectives.

Following the design phase, Make Real developed the following applications/end products:

1. Inductee tablet application
2. Facilitator table application
3. Facilitator content management system for the tablet AR content
4. iOS App Store and Android Play store versions of the classroom serious games
5. Virtual Reality engagement game 'Bridge Builder'

The combination of the above applications met the overall objectives for the CITB push to use Immersive Learning.

The apps were deployed and ready for use in Q4 2019 / Q1 2020 just as the Covid-19 pandemic struck. Having deployed the application to the M27 smart motorways project in the south of England, we were limited by the number of people able to congregate in one room.

The results of the project

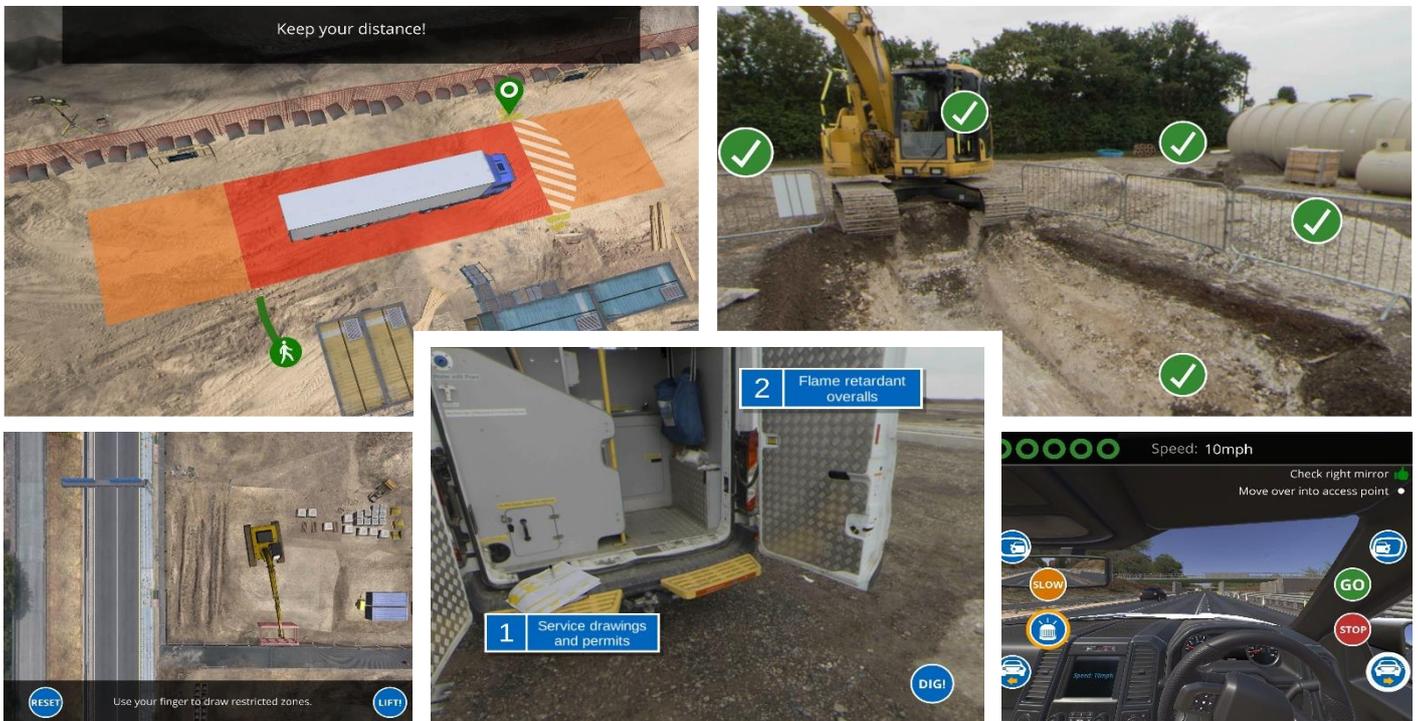
Whilst our rollout and deployment was significantly impacted by the COVID-19 pandemic in early 2020. Early results and feedback were extremely positive, with some of the benefits of Immersive Learning site being:

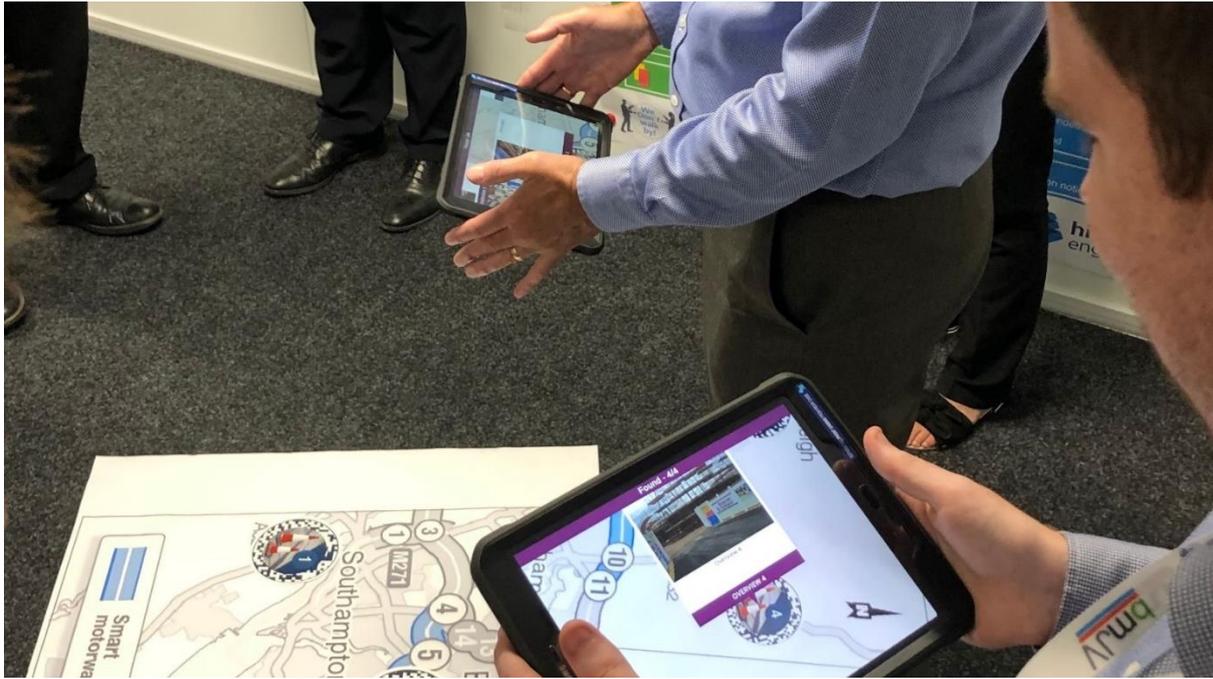
- Improves the image of construction – digital, modern
- Provides a fantastic first impression of a site
- A great introduction to people who may never have used a tablet before
- Learning is engaging and fun
- Transferable to other construction sites and the industry
- Refresher app can be used anywhere
- 100% pass rate

- The design is inclusive since the tablet available in 4 different languages. People learn better in their native language even if they speak good english
- This method of induction has reduced the time spent in induction from 3 hours to around 1.5 hours. A large saving in time and money
- The tablets encourage group discussion which facilitates a positive safety learning environment where everyone can share stories and learn from each other.
- The automatic recording of pass rates has also reduced administration and recording time – approx 5 mins per person.



An Immersive Learning site induction in action





Using Augmented Reality to identify key areas of site.



The Site Induction Refresher app can be downloaded for free on Apple and Android. All the games can be found in this app.

Awards

Since launch, the solution won multiple awards, both internally at BAM Nuttall and also externally.

As a testament to how the project is seen, the project won an internal BAM award at the annual BAM Digicon event in 2020.

The judges said 'A real interactive approach to induction of the workforce onto projects. Susan Fletcher has pioneered this very interactive approach, taking death by PowerPoint inductions to a virtual world that engages the attention of all.'

Also in 2020, the prestigious learning industry awards '*Learning Technology Awards*' gave the solution a bronze award in the '*Best technology-based onboarding programme 2020*'.



LT Awards @LTAwards · 28m

#LT20Awards **Best technology-based onboarding programme**
BRONZE: Make Real with CITB and BAM Nuttall



Review and Discussion

The key to the overall success and positive outcome, was the original identification of a training problem, and challenge by Susan and Kevin. This insight meant we had real challenges to solve and a clear operational need. We applied appropriate technology to a problem, rather than seeking a use for technology.

The main challenge (outside our control) with the project was rollout. Covid-19 hampered our ability to properly engage users, instructors and gain meaningful feedback over the life of the pilot. As a project team we were very disappointed that the rollout we envisioned was severely limited.

Having said that, as a concept, the project and the resulting applications have been received very well by all those that had the chance to use them. We believe the serious games, content and overall approach to have been successful with all feedback has been extremely positive.

Having people contribute to the project who gave their time and enthusiasm to support the vision and create an award-winning product

Identifying an existing procedure that can be improved. This can be hard to do but having the right conversations with the right people, we identified the site induction process.

This project can be scaled up throughout BAM in 2021 and through the CITB become a standard used throughout the construction industry. This project has taken the challenge of traditional time-intrusive and costly inductions and utilised technology to promote learning in more engaging ways. It's more inclusive with the option to learn in different languages and the games and tests are fun but allow facilitators to check that attendees are learning – this is essential to health and safety on site. It's received great feedback from users and proved to have big time and cost savings.'

Further, there have been early discussions about reusing the same content on other projects along with customised versions of the for other sites such as HS2.

Products

Part of the projects aim was to develop content and delivery methods that helped to engage learners and show how immersive and digital learning could be blended into existing approaches. The intention was not necessarily to develop products that could be packaged up and sold as a boxed product or service.

That aim still remains true, however, as noted above, there have been conversations with HS2 and other BAM sites about reusing the concept. We also still very much believe the concept and outputs can add value to inductions. So whilst we're not actively seeking

Recommendations

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- Encourage open and honest conversations
- Share best practice
- Prepare for the unexpected – pandemics, restrictions on travel
- Showcase and promote the product
- Maintain contact with CITB and prepare to provide updates

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