City of Glasgow College

Transforming the image of construction through games-based learning (June 2018)

Summary

Recognising the need to increase participation and widen representation in construction courses, staff at City of Glasgow College have developed a simulation game, Construction manager, for use in schools and pre-apprenticeship courses.

The game places players in roles typically found in a small construction firm, enabling them to experience first-hand the pressures and rewards of the industry as they build up a company from a micro-business to a multi-trade enterprise. Douglas Morrison, director of the Scottish Institute of Innovation and Knowledge Exchange and the college’s STEM and innovation lead, says the game conveys messages about the diverse, multi-talented workforce the modern industry needs.

City of Glasgow College, which has a strong profile in encouraging women and girls to take up careers in the STEM industries, is also taking the lead in developing online blended learning opportunities for those already at work in the construction industry.

Organisation

The college aims to support learners from across Scotland and the international community as well as those closer to home. With around 40,000 learners, its wide-ranging provision ranges from master’s degrees to National Qualifications (NQs), City and Guilds and Scottish Vocational Qualifications (SVQs).

To increase the number of female students on STEM courses, the college runs an annual Women into Engineering Day each March for school-age girls. As a progression route, the college offers the first women-only HNC in mechanical engineering as well as a women-only construction programme.
The challenge

Despite offering a range of career opportunities, growth in the construction industry continues to be hampered by its lack of appeal for some sections of the population, in particular women and some ethnic groups. But the industry also faces a worrying shortage of skilled workers in general.

Outdated images of overalls, muddy boots and wheelbarrows lie at the heart of the problem, even though the industry recruits as many professionally skilled employees as it does manual workers. Construction in fact contributes almost £90bn GVA to the economy each year, represents 6.3% of total GDP and employs around 10% of the UK population in a wide variety of roles.

For the sector to maintain its importance in the economy, and to realise its ambitions for long-term prosperity, companies need a technically competent, digitally skilled workforce, able to take an active part in achieving goals such as inclusive and sustainable growth, fair, ethical working practices and digitally enhanced business solutions.

However, the predominant model in vocational education has focused on skills development in the context of specific disciplines, resulting in a lack of alignment overall between industry expectations and the curricular offer to learners.

This complex scenario has had two negative impacts. Not only does the industry fail to attract the diverse and multi-talented workforce it needs, but those who decide to enter it are not always educated about the issues that are key to its growth and prosperity – issues such as equality and diversity, ethical and sustainable investment, fiscal responsibility and sound environmental and business practices.

“Across the STEM sector there are profound skills gaps, so we know there is an urgent need to change perceptions of industries such as construction. Games-based learning can help by providing a safe space for learners to apply new skills in a fully contextualised environment in which they also receive continuous personalised feedback aimed at improving their performance.”

Douglas Morrison, STEM and innovation lead at City of Glasgow College
Innovative solutions

This is where Construction manager comes in, a simulation game developed by staff at City of Glasgow College in partnership with Learn Direct and Build and Junction-18, a serious games developer. Funded by the Construction Industry Training Board (CITB) and supported by Construction Scotland, the Scottish Contractors Group and the Construction Scotland Innovation Centre, the game is designed to increase awareness of careers and business practices in the industry.

The game places players in roles typically found in a small construction firm, enabling them to experience first-hand the pressures and rewards of the industry as they build up a company from a micro-business to a multi-trade enterprise. Rather than learning passively about what the industry entails, players have to take decisions, make mistakes and learn from the consequences of their actions.

To refine the game during its development, local schoolgirls have been invited to attend workshops hosted by STEM professionals and staff from City of Glasgow College where they play the game and question representatives from the industry and local SMEs.
Throughout the hour-long gameplay sessions, the young players make decisions that affect the profitability of the company, explore a variety of approaches and receive real-time feedback on the effectiveness of their strategies. Adopting roles not only opens these school-aged players’ minds to the range of career opportunities in construction, it also asks them to make decisions about who to employ from the randomly generated, diverse range of workers the game offers them, a task that challenges pre-conceived ideas about gender and ethnic representation in the industry.

“One of the most valuable end-of-game discussion points these workshops have generated is the value of employing and developing a diverse workforce. Participants reflecting on the rationale behind their recruitment decisions come to recognise the unconscious bias that can influence decision-making in the world of work.”

Douglas Morrison

Follow the development of Construction manager here.

Benefits of games-based learning

The adoption of games-based learning is an emerging trend within vocational, technical and professional education and has been shown to be an effective means of developing and reinforcing positive behaviours, attitudes and values.

Despite the seriousness of the learning it generates, games playing is essentially about fun. Players focused on competing with one another to achieve mastery and earn rewards are less likely to notice they are learning and, research suggests, are more likely to retain what they learn.

**Figure 3: Diagram illustrating cognitive processes during games playing**
Another invaluable feature of games-based learning is that learners acquire skills through making mistakes; unlike in the real world, errors in approach incur no serious consequences and lessons learned can be carried forward to the next game. Learners are also able to progress at their own pace, while the twists and turns of the game open up insights into the priorities of those working in industry in a way that passive learning cannot match.

Figure 4: Adapted from Torodova and Moffat (2012)

The reactions of the young participants in the developmental workshops held at the City of Glasgow College illustrate these points well:

“It really annoys you when you lose money or reputation.”

“I found that if my team had more skills, I could take on more jobs.”

“I liked that you could see your finished buildings when your job was done.”
Clear pathways

A further objective of the Construction manager project is to provide a clear, intelligible pathway from school to college and university courses and beyond to employment in the industry. Douglas Morrison believes that games-based learning can achieve this by breaking down the barriers that prevent many learners from opting for construction courses in the first place. He sees a key role for further education in developing this kind of innovative digital approach – and the digital skills needed to access it:

“Colleges sit between schools and higher education and/or employment. We have to make it possible for young people to take part in conversations that will help them understand what the industry offers. They can’t all attend workshops but playing a computer-based game in their own time or as part of a school careers programme can help change their perceptions of the industry.”

Douglas Morrison

Outcomes

Construction manager has already found a role on the City of Glasgow College’s pre-apprenticeship vocational programmes. These are predominantly full-time courses for learners aged between 16 and 25 who are interested in careers in construction but have not yet identified their specific interests and skills. By selecting roles to play, the game enables these would-be apprentices to gain clearer understanding of the different occupations in the sector, accelerating decision-making about the most appropriate courses and placements to apply for once they progress to the next stage of training.

Although currently freely distributed across the Scottish college sector, the game will also be made available to download free on Microsoft Windows operating systems from July 2018. At the same time, it will launch on the Apple app store and Google Play store, and a home console port is under development.
Online learning for construction workers

Those already in work in the construction industry also need to progress their skills. To address a gap in training opportunities in the workplace, in addition to the Construction manager project, City of Glasgow is working with Building Contractors Training Group (BCTG) and Learn, Direct & Build (LDB) to develop the first blended learning programme for supervisors in the construction industry.

The programme, funded by CITB, aims to help the sector increase productivity and efficiency and reduce technical skills gaps by providing an anytime, anywhere learning experience for those already in work.

A key benefit of the programme will be improved competence for supervisors and managers, allowing them to gain new knowledge and refresh existing skills. This in turn will lead to greater efficiency in the management of sites, create safer working environments for operatives and improve the standard of construction.

Find out more

For information about the Construction manager game and the blended learning programme for supervisors in the construction industry, contact Douglas Morrison at City of Glasgow College:

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