



Collaborating with Impact: Increasing student attainment through higher order engagement

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An aerial photograph of London, showing the River Thames winding through the city. The Shard skyscraper is prominent in the background. The foreground shows a bridge and several boats on the river. The text is overlaid on a dark semi-transparent rectangle.

Who are McGee?

A **London-based** multi-disciplined **specialist contractor** equipped to deliver the most complex **civil engineering** and **demolition** projects using world-class expertise.

Collaboration

- Emma Attwood the McGee Marketing & Communications Manager and University Alumni approached the BSc Product Design course at Nottingham Trent University (NTU).
- Initial meetings with McGee management and University staff and management in Autumn 2015
- Led to a brief being developed with McGee for delivery in February 2016
- Based on this success of this the partnership has continued with briefs in 2017 and 2018.

2016

- Delivered to 1 final year student and 42 2nd year students:

The Brief

“To design a cycle safe ‘system’ for an existing construction vehicle (tipper) that is aerodynamic, commercially viable and suitable for off-road and urban conditions.”

- Initial £2000 prize and share of patent offered for winning student group. Actually awarded £4000 across 5 teams.
- McGee and Police initial presentation and introduction,
- Site field trips
- Student presentation to the company and company wide review.

2017

- Delivered to 30 2nd year students:
- A final year student developed previous years product.

The Brief

Man and Machine Interaction: “To design and innovate means to reduce the risk of man and machinery contact..”

- Awarded 3 prizes totaling £3500 + surprise placement to one student.

2018

- Delivered to 41 2nd year students:

The Brief

“To create an integrated emergency first aid facility for use on London construction sites, for both workers, general public and emergency services should a terror attack happen. The solution should be commercially viable, compact, safe and secure.”

- McGee awarded £5000 to 6 teams and plan to develop 3 solutions further to integrate to their sites.

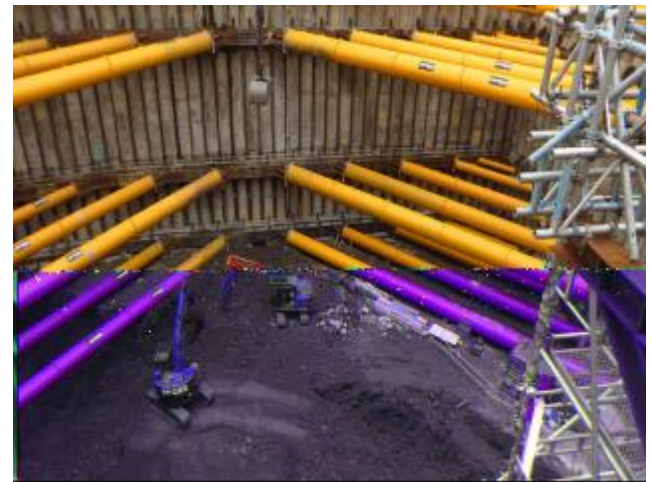
Delivery to students

- Common format 2016-18
- Presentations from McGee management with up to 5 divisions present, plus involvement from the Metropolitan Police (2016) TFL (2018).
- In 2016 a McGee/NTU liveried tipper was provided for the day which was used for an Exchanging Places demonstration.
- Engaged with students in studio with small group Q&A and discussions.



Site visit

- 2 Weeks into the project students are taken to:
 - McGee construction sites and Depot where applicable.
- 2 weeks is key
 - By this stage they would have more detailed questions requirements.
 - Know what they are looking for.
- Return coach to London.
 - Leicester Square 35 meter basement dig in 2017 students went down to the bottom whilst operational.



Site Visit/Validation

- Very beneficial to students:
 - Clarify aspects of the brief
 - Take measurements from the vehicle
 - Speak to the machine operators/construction workers
 - Visualise some of their solutions
 - Get feedback from McGee on ideas
- Often cited as one of the most beneficial aspects of the project.



Academic Benefits - 2016

- Increase in the student attainment on the project in comparison to other projects undertaken that year by the same students.

	Project 1 Individual	Project 2 Group	Project 3 Individual	McGee Group	Project 5 Group	Project 6 Individual	Aggregate Studio mark
Mean	59.3	57.9	59.5	63.0	58.5	51.7	58.1
Aggregate Deviation	+1.2	-0.2	+1.4	+4.9	+0.4	-6.0	
Median	58	65	62	65	52	52	60.5
Mode	55	65	65	68	52	52	62.7
Standard Deviation	9.9	13.4	10.4	7.5	9.4	13.5	7.6

- Marking undertaken prior to knowledge of McGee opinion/success.

Academic Benefits - 2017

- Comparing the same projects the following year with a different slightly smaller cohort:

	Project 1 Group	Project 2 Individual	Project 3 IGroup	McGee Group	Project 5 Individual	Project 6 Group	Aggregate Studio mark
Mean	55.6	54.1	59.9	60.7	52.1	55.3	56.5
Aggregate Deviation	-0.9	-2.4	+3.4	+4.2	-4.4	-1.2	
Median	58	56.5	62	60	56.5	58	59.6
Mode	58	65	65	58	58	58	59.9
Standard Deviation	11.9	15.5	12.2	6.3	9.6	15.7	9.3

- Year on year results are remarkably similar for McGee Project +4.9% in 2016 & +4.2% aggregate mark derivation in 2017.

Academic Benefits - 2018

- Comparing the same projects the following year with a cohort of similar size to 2016:

	Project 1 Individual	Project 2 Individual	Project 3 Group	McGee Group	Project 5 Individual	Project 6 Group	Aggregate Studio mark
Mean	9.7	9.4	10.2	11.5	9.3	11.0	10.2
Aggregate Deviation	-0.5	-0.8	0.0	+1.3	-0.9	-0.8	
Median	10.0	10.5	11.0	12.0	10.0	10.6	10.3
Mode	11.0	11.0	11.0	12.0	11.0	14	11.7
Standard Deviation	3.3	3.1	3.2	2.9	3.0	3.3	2.4

- Year on year comparison of results for 2018 not possible due to new marking criteria.

Academic Benefits

- Increased engagement and motivation amongst students
- With far more detailed research and development than had been seen previously.
- The theory to support why this may be the case is:
 - Company support in terms of how well focussed, detailed and researched the brief was.
 - Real world significance
 - Prize – financial reward
 - Experiential Learning
 - Respect and Importance given

Findings aligning with Literature

- Literature exploring the preferences of Net Generation learners (Millennials) suggest that students have a preference for:
 - Relevant - real world learning experiences
 - Socially orientated and community focussed briefs
 - Social interaction and engagement (Group work)
 - Opportunities to learn through discovery
 - Autonomous - experiential hands on opportunities
 - Visual learning – very much evident in the approach taken by McGee and the Police in presentations to the students
- Enhancing motivation and relevance key factors that can help foster Deep Learning.

(Watkins 2014)

Awards

- Collaboration recognised at the Brake Fleet Safety Awards. McGee and NTU were highly commended in two categories, Innovation and Collaboration.
- Both McGee and NTU were invited to speak at the Brake Fleet Safety conference in May 2017.



Outputs

- Joint Patent in McGee, individual students and staff for the Flexi-Flag concept.
- Lots of press coverage both local and national.
- Talk at the Brake Fleet Safety Conference 2017, detailing the academic-industry collaboration and outputs.
- A paper at E&PDE 2017 Conference.
- 2016 winner has been developed & prototyped.
- Current research project
- Excellent student experience and feedback.

Questions



Research Trial Participation
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