

INGENUITY



**THE CONSTRUCTION MANAGEMENT SIMULATION
FOR STUDENTS IN HIGHER EDUCATION**



Introduction



The **ENGINUITY** computer simulation has been designed for students on Construction Management and related degree programmes to prepare them for a future career in the Construction Industry by :-

- Giving them an insight into how a modern Global Construction Company operates
- Develop Business Management and Employability skills
 - Commercial awareness
 - Strategic thinking
 - Decision making
 - Problem solving
 - Team working
 - Communication



Where Does Enginuity Fit In



ENGINUITY is suited for a wide range of under and post graduate modules because it incorporates many of the key elements taught on Construction Management and related degree programmes.



- Project management
- Business strategy
- Commercial and financial management
- Tendering and procurement
- Value and risk management
- Leading and managing people



A Stimulating Learning Experience



What makes the **ENGINEUITY** unique is that it is delivered as a Competition between the students (split into management teams) that enhances the learning environment, and :-

- Is practical, challenging and competitive
- Puts theory into practice
- Is thought provoking
- Is enjoyable, engendering a sense of achievement
- Cannot be plagiarised (you cannot google the answer)



Easy To Integrate



ENGINUITY is easy to integrate because it :-

- Requires minimal administration from course tutors
- Is played remotely from wherever the students are located
- Offers flexible learning because it can be run over different timeframes
- Is cost effective
- Assessment is easily incorporated



ENGINUITY is a unique and inspirational learning experience, giving participants, grouped into teams, the opportunity to compete against each other to see

WHO CAN RUN THE MOST SUCCESSFUL GLOBAL CONSTRUCTION BUSINESS



Each competing team is thrust into the same 'virtual world', and are given the challenge of running their own Global Construction Business for a number of simulated years, where success is measured by key performance indicators published on a league table.

It will not be easy, with stiff competition for work, a dynamic jobs market, and external world events that can impact upon the business just like the real world.

Developing a successful business strategy is essential, as is being able to work effectively as a team, make key decisions, and solve problems as they arise.

Ultimately their can be only one winner, but everyone also wins if they can grow a successful business.



The Challenge



A UNIQUE MANAGEMENT CHALLENGE

WORLD EVENTS INCORPORATED



Political turmoil, higher interest rates and cost of living crisis in the UK

Affects of the Russia-Ukraine war on energy supplies for the world economy

Construction work for major events, such as the FIFA 2026 World Cup in North America

Continued civil unrest in the Middle East

Global shortage of skilled labour

Climatic affects, such as extreme hot weather, flooding etc

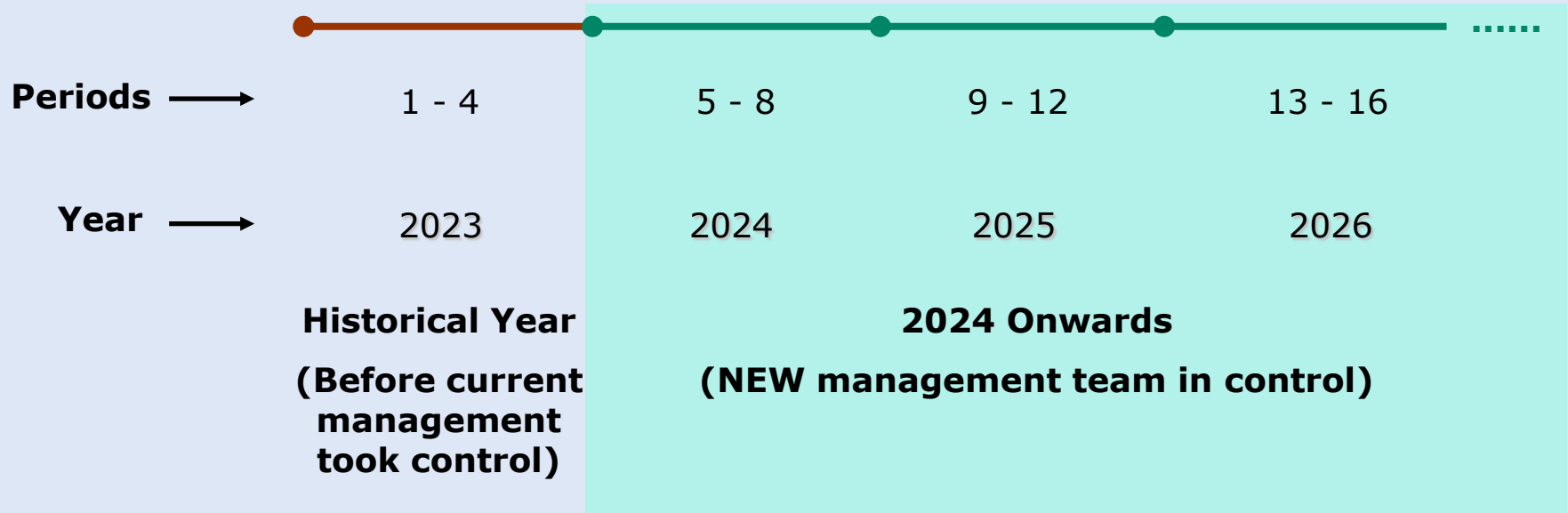
Using a sophisticated computer simulation, competing teams are given the task of managing a fledgling UK-based **GLOBAL CONSTRUCTION BUSINESS** from 2024 onwards.

Operating in a dynamic global economy based upon the 'real world', there are **WORLD EVENTS**, economic, political and environmental, that can impact upon the business, and the **ENGINEUNITY NEWS NETWORK (ENN)** provides the latest world news headlines.

There are jobs, clients, rival competitors, risks and people worldwide, and the **success or failure of the business** depends entirely on the decisions each team makes in a number of key business areas.



Decision Making



Decisions are made for a **period**, representing 3 months, or a quarter, in the real world, in a number of key management areas :-

- Financial management
- Overhead management
- Procurement
- Job progression



Measuring Performance



The performance of each team each round is measured by **Key Performance Indicators**.

Measuring Performance													
Assessing performance Help													
KEY PERFORMANCE INDICATORS				PERFORMANCE SUMMARY									
CLICK ON THE DATA IN A COLUMN TO SEE HOW THE SELECTED KEY PERFORMANCE INDICATOR WAS CALCULATED													
End of period	Status	Year/qtr	Turnover	Gross profit to Turnover	Operating Profit to Turnover	Company Value	Capital Employed	Contract Completion	Forward Workload	Forward Margin	Share Price	Client Satisfaction	Total
4	History	2022 (Q4)	40	170	120	170	130	80	70	100	70	50	1,000
5	Early Years	2023 (Q1)	57	182	185	177	171	101	104	142	81	78	1,278
6	Early Years	2023 (Q2)	76	184	217	187	197	121	81	108	84	99	1,354
7	Early Years	2023 (Q3)	90	165	191	185	216	139	84	111	82	131	1,394
8	Early Years	2023 (Q4)	98	183	219	192	233	164	96	123	100	161	1,569

During the competition, each team's performance relative to each other is displayed on a league table published at the end of each round, which only shows the overall KPI score of each team.



University of Manchester Competition 2023

TEAM LEAGUE TABLE

At the end of period 8 (Early Years)

Position	Name	Sponsor	Location	Total KPI	Improvement	PERIOD MOVEMENT	
						From	Change
1	Fiveguys Branch 13	University of Manchester	Manchester	1,569	13 %	2	1
2	Luk Luk Daai Seun	University of Manchester	Manchester	1,398	6 %	8	6
3	Mandarin	University of Manchester	Manchester	1,394	14 %	15	12
4	Felix Felicis Group	University of Manchester	Manchester	1,392	1 %	3	-1
5	Night Adventurer	University of Manchester	Manchester	1,374	3 %	7	2
6	P&L (Peace and Love)	University of Manchester	Manchester	1,365	21 %	16	10
7	Tree New Bee	University of Manchester	Manchester	1,347	7 %	11	4
8	yyds g8	University of Manchester	Manchester	1,340	-1 %	4	-4
9	Produce 101 Agency	University of Manchester	Manchester	1,338	-1 %	5	-4
10	Zero to One	University of Manchester	Manchester	1,337	8 %	13	3



Where Enginuity Has Been Used



Institution	Country	Department / Programme	Level	Length
Auckland / Canterbury Universities	New Zealand	Civil Engineering (Construction Management)	Ug	Semester
Bath University	UK	Architecture & Civil Engineering (International Construction Management)	Pg	3 days
Birmingham City University	UK	Built Environment (Construction Project Management)	Pg	Semester
Continuous Professional Education Centre	Hong Kong	Built Environment (Business Management)	Pg	Semester
Institute of Carlow	Ireland	Built Environment (Quantity Surveying and Construction)	Ug	Semester
Glasgow Caledonian University	UK	Built and Natural Environment (The Engineer in Business)	Ug	Semester
Liverpool John Moores University	UK	Built Environment (QS and Construction Management)	Ug/Pg	Semester
Manchester University	UK	Mechanical, Aerospace & Civil Engineering (Project Management)	Ug	Semester
Melbourne University	Australia	Civil and Environmental Engineering (Engineering Contract & Procurement)	Pg	Semester
Oxford Brookes University	UK	School of the Built Environment (QS and Commercial Management)	Ug	Semester
Portsmouth University	UK	Civil Engineering and Surveying (General Management in Construction)	Pg	Semester
Queens University, Belfast	UK	Planning, Architecture & Civil Engineering (Civil Engineering)	Ug/Pg	Semester
The Global School of Technology & Management	Singapore	Built Environment (Construction Project Management)	Pg	Semester
University of Limerick	Ireland	Management and Marketing (Project Management)	Pg	2 weeks
Waterford Institute of Technology	Ireland	Construction & Civil Engineering (Project Management)	Pg	Semester



Showcase



Postgraduate students from the Department of Civil and Environmental Engineering at the **University of Melbourne** have been playing an annual Enginuity Competition since 2010 as part of their module 'Engineering Contract & Procurement'.

During the latest Competition between August and October 2023, there were 160 students split into 27 teams, and competing over 7 rounds, or two simulated years.



ENGINUITY

COMPETITIONS

HOME ANNUAL COMPANY HIGHER EDUCATION

UNIVERSITY OF MELBOURNE 2023



Postgraduate students from the Department of Civil and Environmental Engineering took part in their own internal Enginuity Competition as part of their their module **Engineering Contract & Procurement**.

The students were split into 27 teams, and competing over 7 rounds, or two simulated years, between August and October 2023.

COMPETITION DETAILS

The final league table
The story, period by period
Comparative assessment of all teams

THE FINAL RESULT: "'Just Engineers' are crowned the 2023 Champions!"

The final round of the Competition saw **"Just Engineers"** pull way from their nearest rivals with 5% growth to deservedly be crowned the University of Melbourne Enginuity 2023 Champions with an impressive finishing score of **1,753** pts, and a 100 point gap to their nearest challengers, and ultimately their success owed much to them demonstrating one of the guiding principles in running a successful business, consistency, having led the competition for the final 3 rounds, and only being out of the top four on one occasion.



Testimonial



"Coming from industry I am keen to encourage practical learning and enhance employability skills to ensure students transition into work with both the technical and interpersonal attributes to succeed in their careers, and the Enginuity competition certainly delivers this.

The rationale for the strategic and general management unit was based on providing an engaging and practical understanding of the complexities of construction management.

Students manage a global construction business over 12 weeks and consider management data and forecasts, weigh up options and analyse risks, under tight weekly deadlines.

Learning is highly experimental as students test their theories during trialling to see which combination of decisions will be successful, reflect upon the success of their submissions and develop knowledge and skills from scores, feedback and group discussion".

Rebecca Allan
School of Civil Engineering and Surveying
University of Portsmouth



Example Semester Model



WEEK 1

INTRODUCTION & TEAM SETUP

- **Slideshow introduction** provided by Virtual Management simulations (VMS)
- Introduction **delivered by** the module leader
- **Teams formed** (3-6 students in each team)
- **Software installed** by the students on their personal computers
- **Data and instructions** for the Competition sent to each team

WEEKS 1-3

TRIALING & SUPPORT

- **Teams learn how to play** Enginuity by trialling, individually or as a group
- On-line **Learning Zone** with tutorials and FAQs
- VMS provide **detailed feedback** with each trial to help the students learn quickly
- VMS provide **7-day support** to the students

WEEKS 4-10

THE COMPETITION

- Up to 8 **weekly rounds**
- Rounds split between the **Early and Later Years**
- Dedicated **Competition web page** with league tables, news headlines etc

WEEK 11

ASSESSMENT & FEEDBACK

- **Assessment** in form of group reports / presentations by the teams
- VMS provide a **graphical performance report** to the teams and module leader
- VMS can deliver an on-site/on-line **feedback session**