
UCL
Engineering Education Existing Staff Capacity Enhancement Programme
FACILITATING GROUP & PROBLEM-BASED LEARNING IN THE CONTEXT OF ENGINEERING EDUCATION
Day One: Tuesday 24th April, 2018
UCL ENGINEERING
Change the world

Introduction to…

Dr Folashade Akinmolayan

Teaching Fellow, Department of Chemical Engineering (UCL)

Researcher, Centre for Engineering Education (UCL)

Relevant experience

- Implementation of departmental team-based projects ranging in different time spans
- Development of projects that combine discipline specific technical knowledge and communication skills
- Developed a self-reflection methodology for students to learn from the perception of their peers through teamwork

Introduction to…

Prof. Shannon Chance

Lecturer, School of Multidisciplinary Technologies (DIT)

Marie Curie Research Fellow, Centre for Engineering Education (UCL)

Relevant experience

- Developed a focus on engineering education research through a 2012-13 Fulbright Fellowship
- Current research: collection of data in four European countries to evaluate the role of design projects in the learning, epistemological development, and retention of students - with a focus on women's experiences

Workshop Agenda

Day One	
Time	**Theme**
10.00am-11.00am	Introduction to Participants and the Workshop Objectives
11.00am-11.15am	Coffee Break
11.15am-12.15pm	Effective Teamwork Theory: What you need know and what students need to know
12.15pm-1.00pm	Interactive session: Curriculum development and team-based learning
1.00pm-2.00pm	Lunch
2.00pm-3.15pm	Working groups: Group Based Learning (GBL) development
3.15pm-3.30pm	Coffee Break
3.30pm-4.30pm	Working groups: GBL development workshop
4.30pm – 5pm	Peer Assessment and Day One wrap-up

Workshop Agenda

Day Two	
Time	**Theme**
9am-9.15am	Welcome and review of the Day's Agenda and Objectives
9.15am-10am	Peer assessment and self-reflection
10am-10.15am	Coffee Break
10.15am-11am	Team formation and Assessment rubrics
11am – 12pm	Working groups: GBL development workshop
12pm-1pm	Lunch
1pm-3pm	Working groups: GBL presentation and discussion
3pm-3.15pm	Coffee Break
3.15pm-3.45pm	Peer Assessment: Responses to feedback
3.45pm-4pm	Closing Remarks

	Date: 24/04/18
What do you want to gain from this course:	
Feedback received from peers:	
(Fill this section with the peer feedback you received for day one)	
Reflection after Day One	
Questions to help you reflect:	
What did you learn from this feedback? Did you learn anything about yourself from the feedback or did you learn more about the team from their feedback to you?	
How do you feel about working in this team? What aspects of the team were able to work well with? What aspects of this team did you find a hindrance?	
What do you think your main strengths are ?	
Are there any repeated words or phrases that your peers use to describe you and your team effort?	

Developed by: Dr Folashade Akinmolayan

- Adaptation of self-reflection forms students use for team-based projects
- Form will be explained over the course of the two days

What do you want to gain from this course?

TEA/COFFEE BREAK

Workshop Objectives

Teamwork is one among a number of professional skills ***increasingly emphasised by industry*** as a key to graduate employability and as a result, it is becoming ***increasingly important in engineering education***.

This workshop will help participants to:

- Understand the importance of teamwork in curriculum
- Design activities suitable for teams
- Share variety of team formation methods to put teams together
- Explore instances where teams do not function well
- Explore how support materials and interventions can provide invaluable learning experiences for our students.

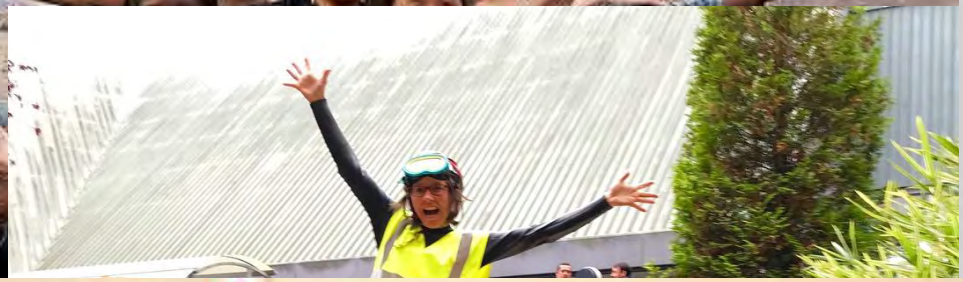
EFFECTIVE TEAMWORK THEORY:

WHAT YOU NEED KNOW AND WHAT STUDENTS NEED TO KNOW

Why work in groups?

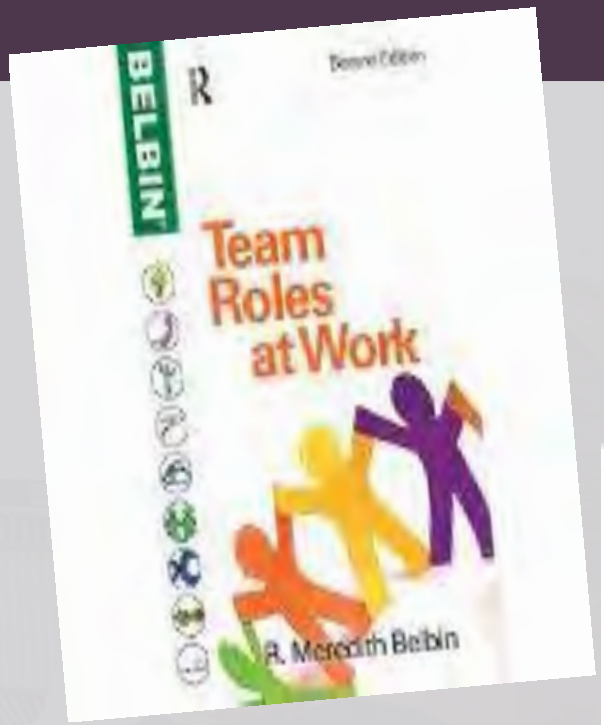
Engineers work on complex, large scale projects that require a variety of different skills and expertise in a fast-paced and rapidly changing environment

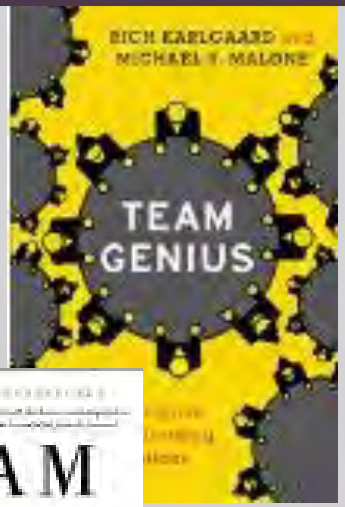
Facilitating learning groups

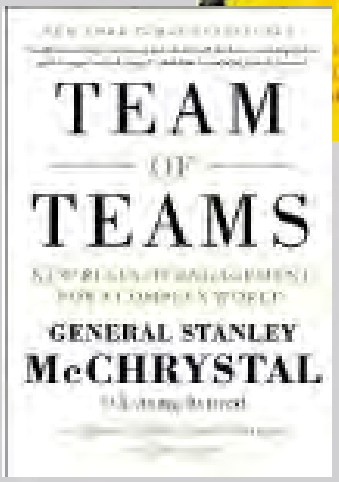


Logical reasoning vs. animal instinct

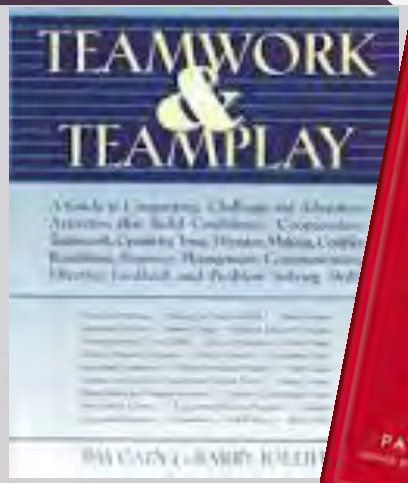
Logical reasoning vs. animal instinct

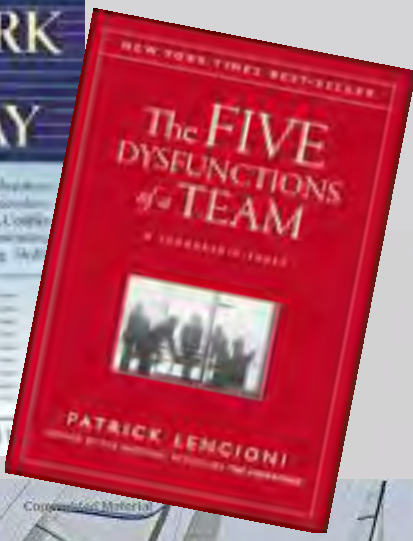

BELBIN
Team Roles at Work
R. Meredith Belbin


RICH KARLGAARD and MICHAEL S. MALONE
TEAM GENIUS

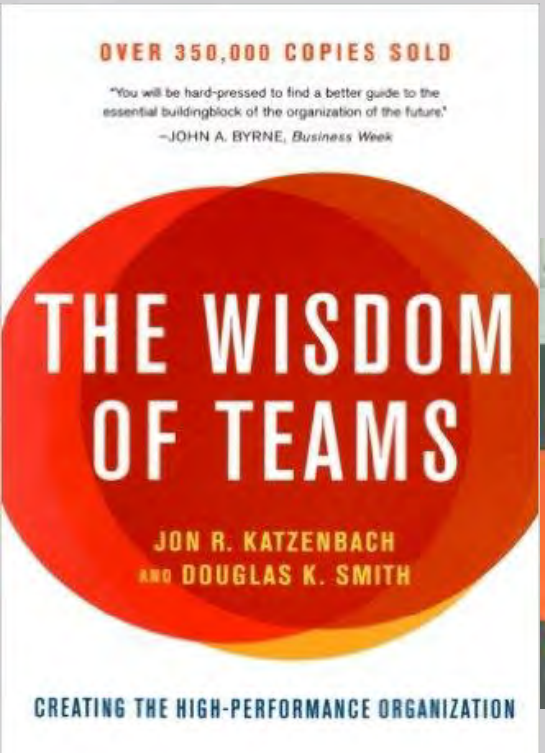

TEAM OF TEAMS
GENERAL STANLEY McCHRYSTAL


MANAGING TEAMS


TEAMWORK & TEAMPLAY

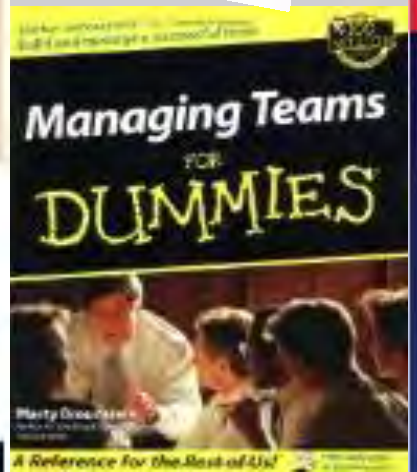

The FIVE DYSFUNCTIONS of a TEAM
PATRICK LENCIONI


THE TEAM-BUILDING TOOL KIT


OVER 350,000 COPIES SOLD
"You will be hard-pressed to find a better guide to the essential buildingblock of the organization of the future."
–JOHN A. BYRNE, Business Week
THE WISDOM OF TEAMS
JON R. KATZENBACH AND DOUGLAS K. SMITH
CREATING THE HIGH-PERFORMANCE ORGANIZATION


x-teams


FINANCIAL TIMES
Essential Guides
LEADING YOUR TEAM


Managing Teams FOR DUMMIES

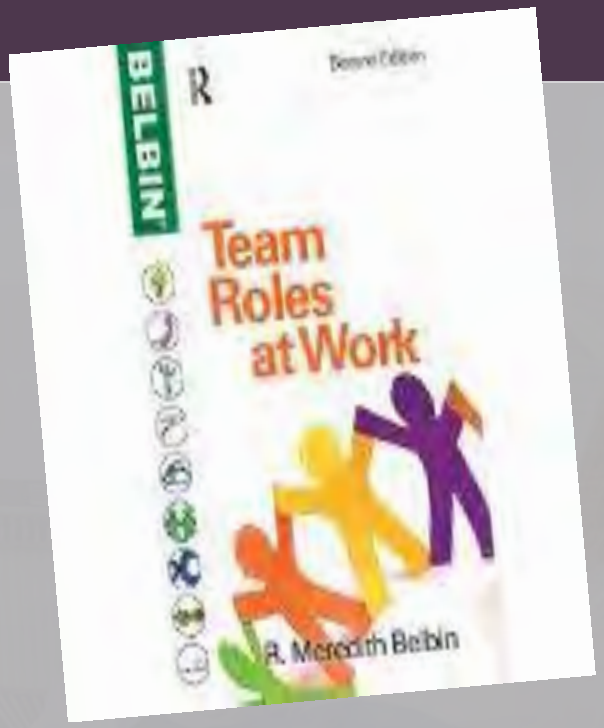

Fourth Edition
Group Dynamics for TEAMS
Daniel Levi

What is an effective team?

- Performs
- Stays together
  (success at group level)
- Develops new knowledge and skill
  (success at individual level)

What do effective teams Do?

- Set **vision** and **performance goals**
- Assign **task-based** *and* **team-based roles**
- Decide and create **group processes**
- Develop trust in **interpersonal relationships**
- Develop appropriate **intergroup relations**



The Belbin 9 Team Roles

http://www.belbin.com/about/belbin-team-roles/

- Resource Investigator
- Teamworker
- Coordinator
- Plant
- Monitor Evaluator
- Specialist
- Shaper
- Implementer
- Completer Finisher

Vision vs. goals?

- Know where you are headed
- You need to head in the same direction – *do you aspire to win or do you just want to survive?* Individuals may need to make compromises
- Goals are generally easier to decide on than your vision
  - Performance goals are SMART – specific, measurable, achievable, relevant and timely

Assign task based roles *and* team based roles

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Show your students how to plan

Together – *as a team* you must always know:

- **who** is doing **what** and **when**

To do so – breakdown the project deliverables into component parts and ask:

- **which** parts require you to work **together** and which can you allocate to **individuals**?
- plan your **team meetings** around **collective tasks** and **review dates**

Assign task based roles *and* team based roles

Show your students how to plan

Together – *as a team* you must always know:

- **who** is doing **what** and **when**

Daily debrief, sharing answers to 3 questions with the whole team:

- What have you just done?
- What are you going to do next?
- What problems have you faced/do you anticipate?

More often as you near the **deadline**

Falcons Team Contr

Project Name:	
Team Members:	

Our Agreement

- [ ] We all promise to follow classroom expectations and proc
- [ ] We all promise to listen to each other's ideas with respec
- [ ] We all promise to do our assigned work to the best of ou
- [ ] We all promise to turn in our work on or before due date
- [ ] We all promise to ask for help if we need it.
- [ ] We all promise to share responsibility for our success a mistakes.
- [ ] We all promise to turn in work that is our own.

If someone in our team breaks one or more of our rules, the i right to call a meeting and ask the person to follow the rules. still breaks one or more of our rules, we have the right to vote person.

Date: _____

Team Members Signatures:

_____

_____

_____

_____

Team Meeting

[Click to select a date]
[Time]
[Location]

Meeting called by: **Type of meeting:**
Facilitator: **Note taker:**
Timekeeper:

Attendees:
Please read:
Please bring:

Minutes

Agenda item: **Presenter:**
Discussion:
[Click here to enter text]
Conclusions:
[Click here to enter text]

Action items	Person responsible	Deadline
✓		
✓		
✓		

Agenda item: **Presenter:**
Discussion:
[Click here to enter text]
Conclusions:
[Click here to enter text]

Action items	Person responsible	Deadline
✓		
✓		
✓		

Agenda item: **Presenter:**
Discussion:
[Click here to enter text]
Conclusions:

Managing different Time Management Styles

Your Time Management Style?

1) You have are given three months to complete a big assignment, do you…

a. Leave it until the week before, believing it will only take a few hours because you have thought about it a lot beforehand.

b. Set aside time to work on it each week so that you make steady progress over three months?

c. Miss the deadline entirely and pretend you've left the country.

d. Start as soon as you can and get it done to avoid having it hanging over you.

Your Time Management Style?

2) You have to research and write a report. At what stage would you write your conclusion?

a. You decide what it will be as you research, and it will be the first thing you write.

b. You start writing from Day One and think about the conclusion when you get there.

c. You make an outline of it before you start your research. You may change it slightly, but you need to know where you are headed before you can start research.

d. You don't bother writing conclusions.

Your Time Management Style?

3) You have planned a Saturday evening out with friends. Just as you are heading out, your boss calls you and asks you to go in to work right away because there has been a muddle up with the rotas. Do you…

a. Quit the job there and then because you can't work for such a disorganised people.

b. Go with the flow because accidents happen and you need the money anyway.

c. Go into work feeling resentful and make your feelings known to your boss.

d. Start heading into work, but if you bump into a friend on the way you may decide to hang out with the friend instead.

Your Time Management Style?

4) When you use to-do lists, do you…

a. Write a to-do list every day and always complete it in the same day.

b. Never write a to-do list.

c. Use it as a guide so that you know roughly what you need to do and write a new a to-do list weekly.

d. Enjoy crossing off each task as you do it. At the end of the day you might even add in any unlisted tasks you completed and cross them off, too.

Your Time Management Style?

5) You have invited some friends round for a meal. Are you most likely to…

a. Forget that you had invited them and serve eggs on toast and enjoy the evening anyway.

b. Enjoy prepping a lot of food that you can do in advance, so that you only have to cook rice once they arrive.

c. Go shopping a few hours before they arrive and see what inspires you in the shops.

d. Buy pre-prepped food so that absolutely everything is done.

Your Time Management Style?

6) Your friend offers to lend you a new thriller, which she has raved about. It sounds brilliant. Do you…

a. Start reading it right away even though you have got three other books on the go (or is that five?).

b. Say ‘no’, as you are wading through another book and, although you are not enjoying it, you feel you must finish it.

c. Take the book from her and then forget you have borrowed it.

d. Borrow the book but wait until you have finished your current novel before starting it.

Your Time Management Style?

7) You are taking a short city-break. Do you…

a. Get the city guide, research on-line, and plan a daily schedule of outings along with journey plans, places to eat, etc.?

b. See the whole thing as an adventure—you'll learn about the city once you get there.

c. Buy the city guide at the airport and make a note of one or two things must-see things.

d. Buy the city guide in advance and make a daily plan, although you might change your mind once you get there.

Your Time Management Style?

8) In one of your work teams, a disagreement breaks out over how to do an assignment. Do you…

a. Join in the discussion and try and force them to resolve it by coming down on one side or the other.

b. Try and talk them into a truce, because there are two sides to the issue and they need to agree to disagree and move on.

c. Immediately seek help from a senior member of staff.

d. Let them get on with it.

Your Time Management Style?

Time Management Quiz Scoring and Answers

Add up your scores:

Q1: a=2 b=3 c=1d=4
Q2: a=3 b=2 c=4 d=1
Q3: a=4 b=2 c=3 d=1
Q4: a=4 b=1 c=2 d=3
Q5: a=1 b=3 c=2 d=4
Q6: a=2 b=4 c=1 d=3
Q7: a=4 b=1 c=2 d=3
Q8: a=3 b=2 c=4 d=1

If your score is **17 or over** you are a **planner.**

If your score is **16 or under** you are a **responder.**

Planners:

You live your life in a goal oriented way. You are able to see the way to achievement and plan your path toward it with ease. You probably enjoy the planning stages and tend to be able to stick to the plans that you make. You like to compartmentalise time. You do not feel happy with uncertainty or living with a mess. You like to finish one task before you start the next one and you are often well prepared for deadlines. Sometimes you may shut a task down too soon and miss important developments in the field. Responders are perplexed by your need to know when things will be done.

Responders:

You like to live your life engaging with the new data all the time. You often get side-tracked. You like to stay open to new experiences, to remain spontaneous, and only when a deadline looms are you able focus 100%. Sometimes, this happens just a little too late and you may compromise your outputs. You are good at dealing with last minute changes and at responding quickly, and you find uncertainty relatively easy to live with.

You drive planners mad by your need to stay open to new developments and your lack of focus in the early stages.

Words for Planners:

Structure, demarcate, plan, schedule, chunks, timetable, boundaries, limits, deadline, realistic, early, compartment, closure, order, decide

Words for Responders:

Flow, travel, space, spontaneous, late, pressure, adventure, unconstrained, journey, free, wait and see, surprise, unplanned, impromptu, adapt, open

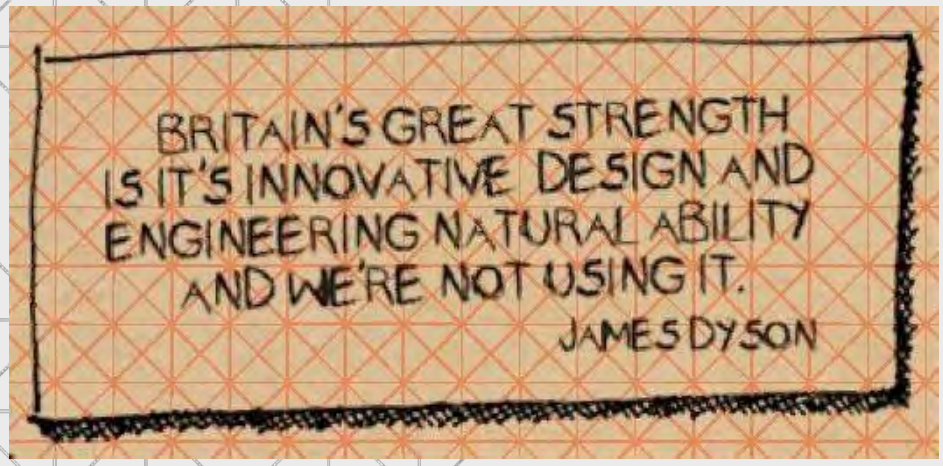
INTERACTIVE SESSION:

CURRICULUM DEVELOPMENT AND TEAM-BASED LEARNING

UCL Engineering Vision

- *"At UCL Engineering we take bright, thoughtful, creative people and give them the knowledge, skills, and experience they need to engineer a better world.*

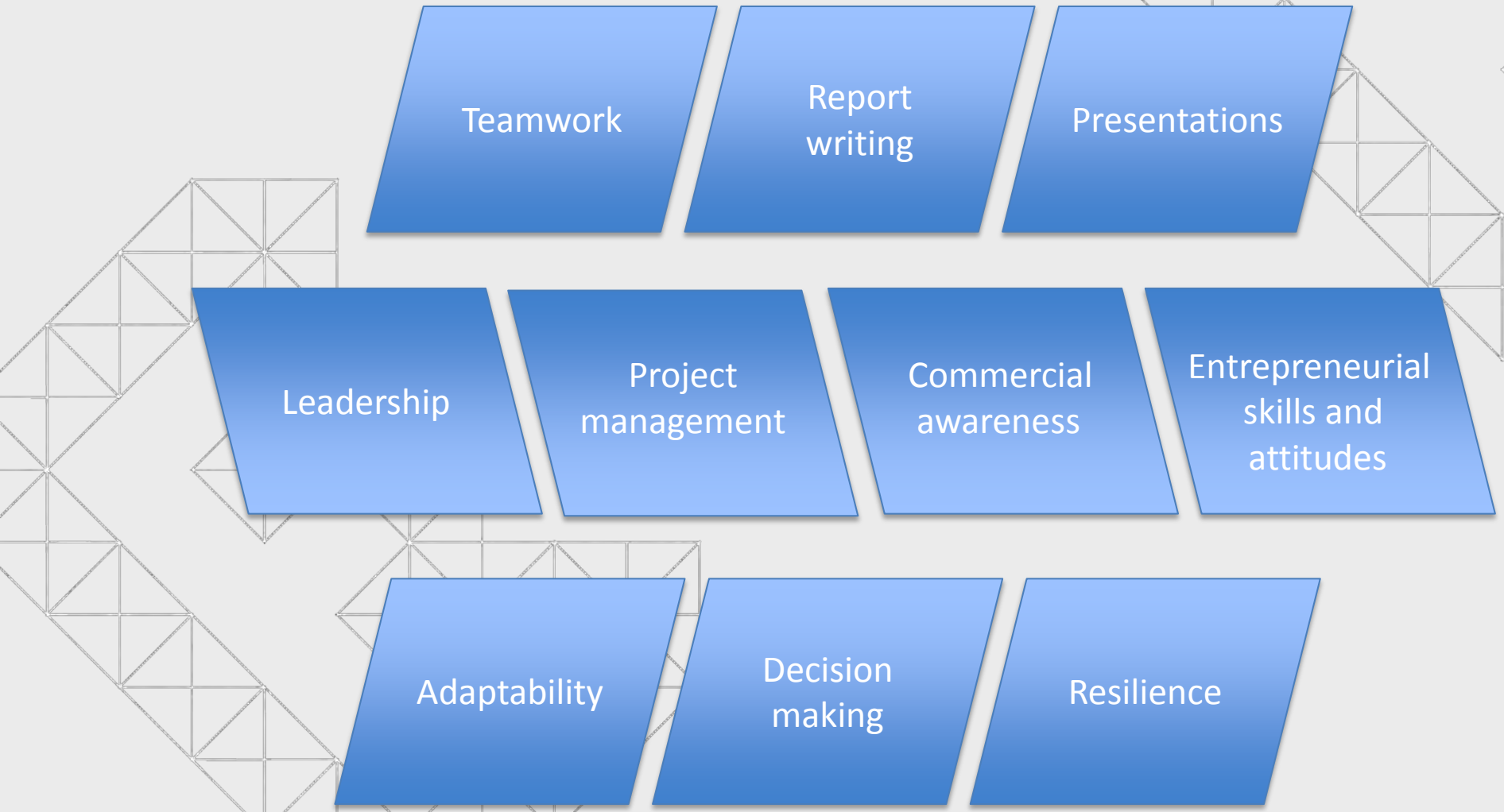
- *We teach them to think, make, model, design, analyse, challenge, and innovate, and then let them practice what they've learned by tackling engaging projects that address real-world problems."*



TO CHANGE THE WORLD, YOU NEED TO BE TAUGHT DIFFERENTLY

Non-technical skills development

- Problem-based learning enables students to apply their theoretical knowledge whilst developing their professional skills.



Chemical Engineering Scenarios

CHEMICALS	ENERGY	CHEMICALS	ENERGY	CROSS-SECTOR	PHARMA
					
Process Plant	**Natural Gas Transportation and Liquefaction**	**Air Separation**	**Biofuels**	**"Hidden heroes" - Instrumentation** Practical	**Pharma Formulation Development** Practical

Year 1 - Example Scenario Outputs

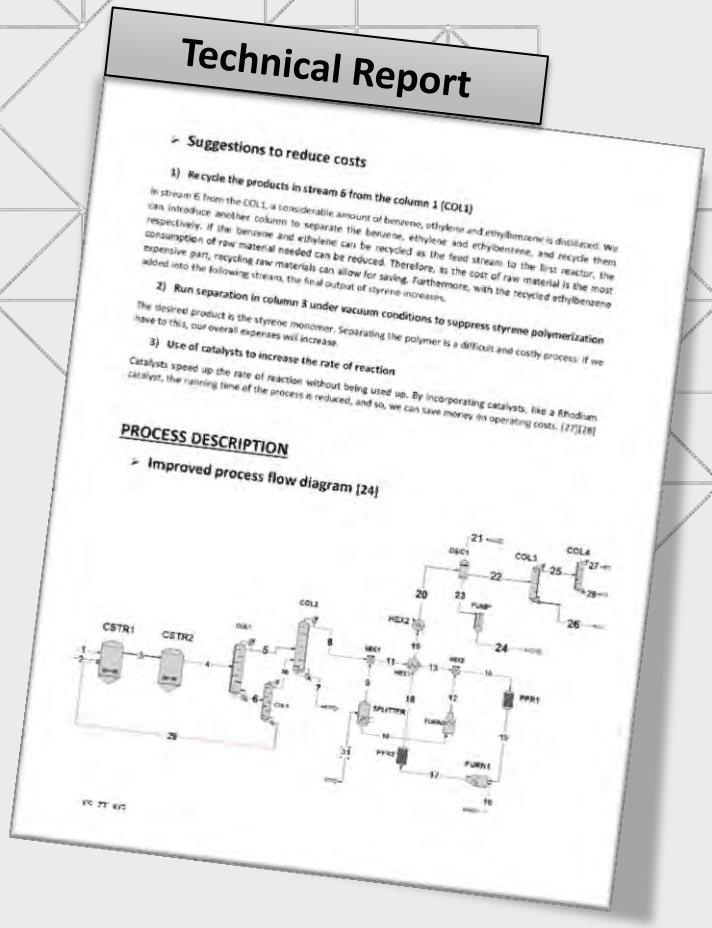
Process Plant Design

Design Brief

"Bentham Corporation is a company that produces styrene monomer. Styrene is a monomer used in the production of polymers which are the basic building block of the plastics industry.

*Following an increase in the demand for the styrene monomer, Bentham Corporation has been looking to **increase the capacity of their existing processing plant**. Your team has been invited to **prepare a proposal for the construction of an improved styrene processing plant** to help Bentham Corporation meet their increased demand."*

Poster Presentation



Student Feedback:
"I enjoyed Scenario 1 and looking forward to Scenario 2."

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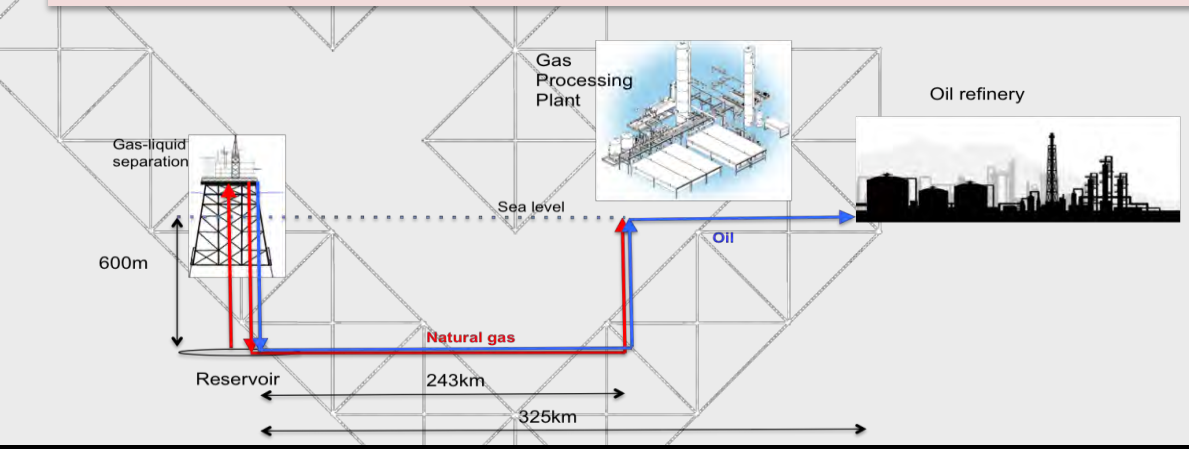
Year 1 - Example Scenario Outputs

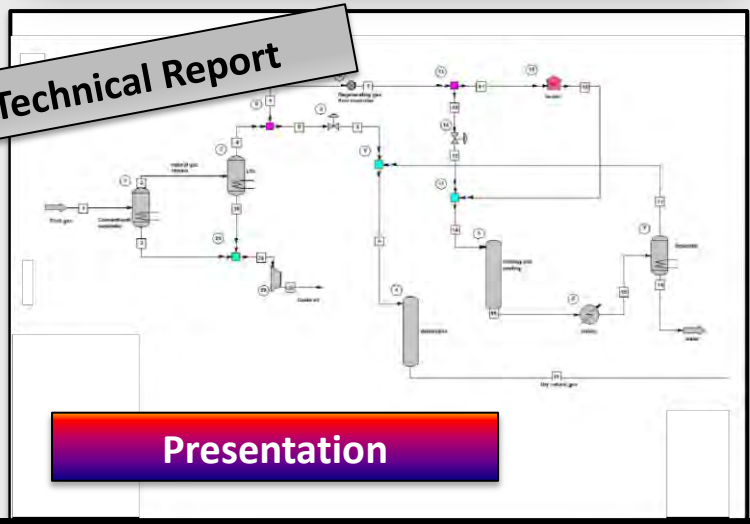
Natural Gas Transportation & Liquefaction

Design Brief

*"TOTAL has **discovered two natural gas reserves**, Laggan and Tormore, offshore Shetland, UK. The two deepwater fields are expected to meet 8% of the UK's gas needs. To facilitate extraction and use of these new gas reserves, the company requires **delivery of the extracted natural gas to a gas processing plant** and the **distribution of the subsequent processed methane gas to market via liquefaction**.*

*You have been shortlisted for the tender of **(1) the pipeline systems** to deliver the oil/gas to processing plants - along with their associated auxiliary equipment (e.g. pumps) and **(2) the liquefied natural gas (LNG) plant** to liquefy the processed gas stream."*





Student Feedback:
"I felt like a real engineer when completing this task."

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Year 2 – Example Scenario outputs

Air Separation

Design Brief

"Ramsay Limited is a food packaging company […] who are looking to increase their demand for gaseous nitrogen by 50%. As a result, they ***are investigating the option to locate an on-site cryogenic nitrogen generator*** *at their plant.*

Ramsay Limited has ***requested an analysis of the process equipment, safety risks and energy requirements*** *associated with such a proposal. Your company has been asked to complete this analysis by Friday 6th November 2015, ready for dissemination to Ramsay's Board members the following week."*

Technical Report

Safety Assessment

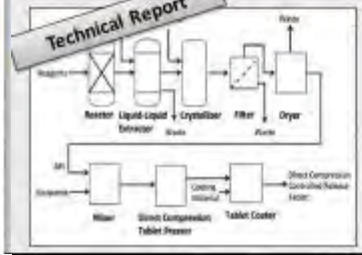
Pharmaceutical Formulation Development

Design Brief

"Pharma company Fizer has an active pharmaceutical ingredient (API) that has reached Phase II of the drug development process.

Your task is to ***assess the viability of formulating this API into a tablet/capsule.*** *You are also required to* ***consider process design factors*** *of the powder* ***upon scale-up*** *and* ***commercialisation,*** *as well as* ***investigate the challenges*** *associated with transforming* ***existing batch-plant capacity to continuous flow processing."***

Technical Report



Creative Presentation

"Hidden Heroes" - Instrumentation

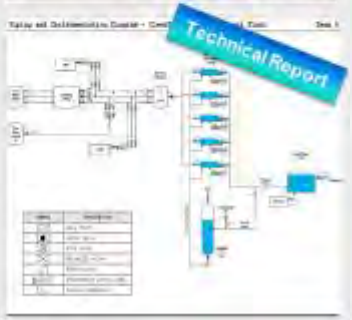
Design Brief

"CleanTech is currently looking to ***hire a team of piping specialists*** *with outstanding* ***technical knowledge*** *but also with the* ***ability to communicate*** *with customers with varying degree of technical knowledge and interest.*

CleanTech will ***test your skills*** *by* ***(1)*** *evaluating your* ***ability to read and understand engineering drawings*** *and by* ***(2)*** *considering your* ***communication skills of technical information to a diverse audience.*** *As a* ***case study,*** *a clean water treatment plant will be considered."*

Video Presentation

Technical Report

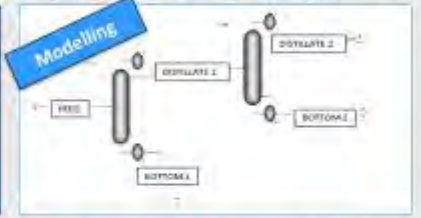


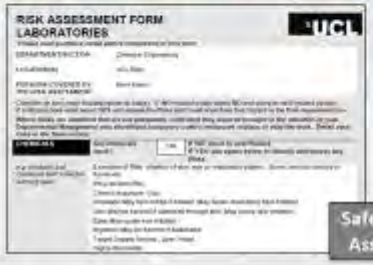
Bioethanol Pilot Plant Design

Design Brief

"UCL's Faculty of Engineering Sciences is considering ***building a pilot scale biofuel facility*** *at its planned new campus on the Queen Elizabeth II Olympic Park, or UCL East. Your task is to consider* ***the design of the separation section;*** *in particular, to* ***recommend a plant size*** *and* ***operating mode*** *(batch or continuous),* ***what experiments the students may be able to undertake,*** *and whether the plant design can be* ***flexible*** *enough to consider both bio-ethanol and bio-butanol".*

Modelling





Experimental Design

Safety & Risk Assessment

Developing Teaching Learning Outcomes

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Organisation – Scenario Weekly Structure

MONDAY

- Morning launch lecture/video
  - Introduction to project
  - Background information
  - Week structure
  - Explanation of deliverables
  - Team allocation and facilitation session

Note: Through-out the week some rooms are made available to the students for group work

Organisation – Scenario Weekly Structure

MONDAY **TUESDAY**

84% - Just right

- Client meeting 1 (Compulsory)
  - Student deliverables checkpoint
  - Attendance is monitored

- Facilitation/helpdesk (non-compulsory)
  - Drop-in sessions
  - Help students with simulation/lab aspects

Note: Through-out the week some rooms are made available to the students for group work

Organisation – Scenario Weekly Structure

MONDAY	TUESDAY	WEDNESDAY

- Facilitation/helpdesk (non-compulsory)
  - Drop-in sessions
  - Members of staff are available in the rooms at allocated times for guidance
  - Help students with simulation/lab aspects

Note: Through-out the week some rooms are made available to the students for group work

Organisation – Scenario Weekly Structure

68% - Just right

MONDAY	TUESDAY	WEDNESDAY	THURSDAY

- Client meeting 2 (Compulsory)
  - Student deliverables checkpoint
  - Attendance is monitored

- Facilitation/helpdesk (non-compulsory)
  - Drop-in sessions
  - Help students with simulation/lab aspects

Note: Through-out the week some rooms are made available to the students for group work

Organisation – Scenario Weekly Structure

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY

- Morning facilitation session (non-compulsory)
  - Final preparation for assessment
- Assessment (compulsory)
  - Poster/oral presentation and video
  - Written: report submission
  - Peer assessment

Note: Through-out the week some rooms are made available to the students for group work

Discuss:

What goals do you have for incorporating teamwork into your curriculum?

Think about the pedagogic and department/school wide impacts

Feedback from student

*"This module really helped me **learn about the concept of teamwork** and other complementary principles such as safety evaluation…..*

*The scenario topics were well chosen and were well related to our courses (but **interesting** at the same time). Although we suffered a lot in the beginning, the teaching staffs were really helpful and approachable during the scenario week and helped us survive the nightmares.*

*The peer assessment was very helpful in penalizing those who could not be penalized by group marks. The best part of the scenario is that every time we have **different teams chosen based on different criteria**. This really made me **understand the difficulties in different teams and enhanced my understanding of teamwork**."*

(Design and Professional Skills II)

LUNCH

WORKING GROUPS:

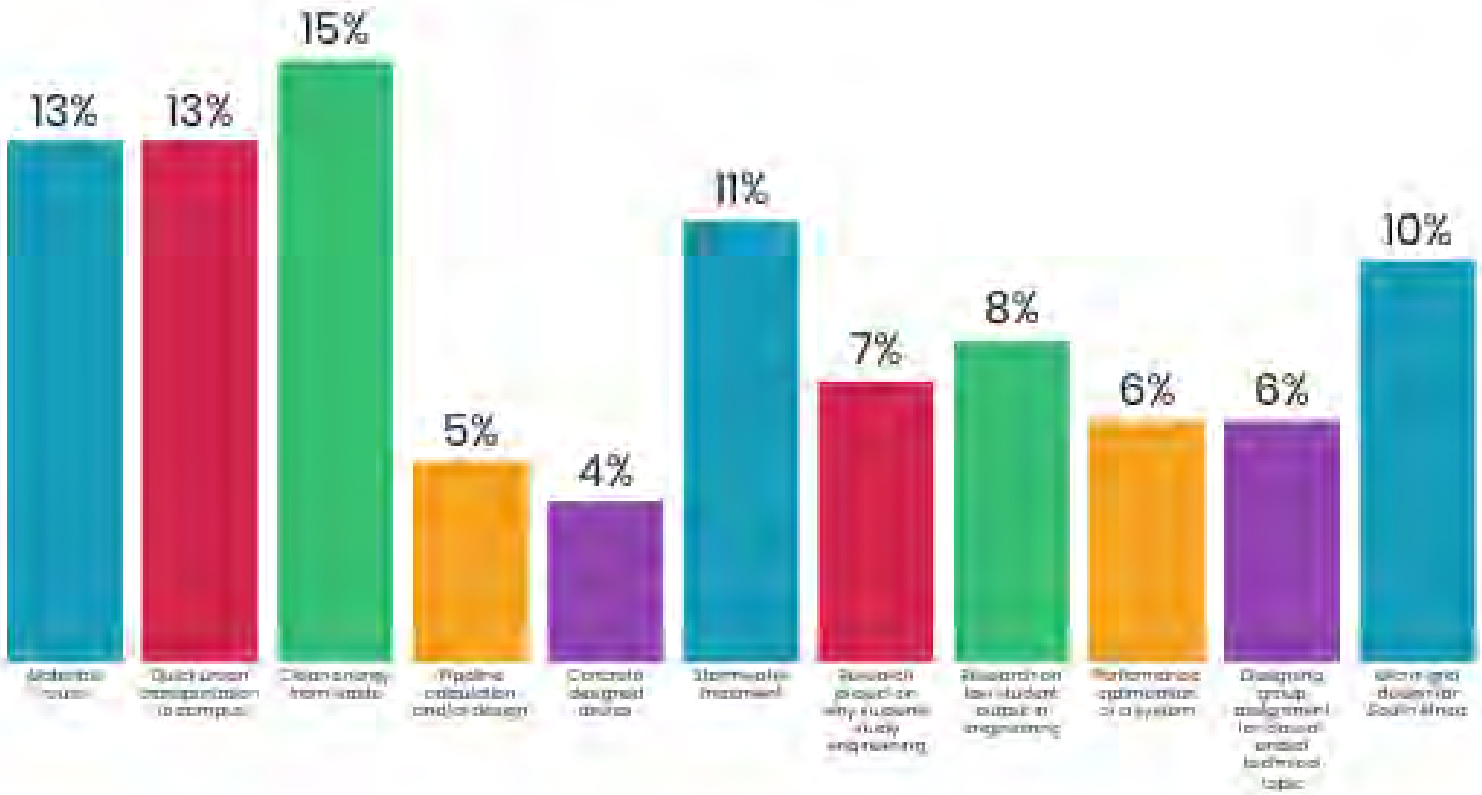
SESSION 1: GROUP BASED LEARNING (GBL) DEVELOPMENT

https://www.mentimeter.com/

Go to **www.menti.com** and use the code **28 00 74**

Mentimeter

Select your favorite topics for development into group activites (no more than 5)



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Brainstorm phase

Over 4 sessions, in your teams, you are required to:

- Design a team based activity with a specific technical aim
- You will explain this activity in the fourth session

Let's brainstorm ideas for technical topics and then select 5/6 for development into group based learning activities

Some things for your group to consider

On Day One:

- What are the learning objectives for your task?
  - Can the tasks be sub-divided?
  - How to incorporate individual elements
- What MUST be included for the assessment criteria?
- What would the development team need?

On Day Two:

- What would the teams look like? Size? Formation?
- How best can we assess this activity?
- Is this activity fit for purpose or does it need to be adapted?

Some things for your group to consider

On Day One:

- What are the learning objectives for your task?
  - Can the tasks be sub-divided?
  - How to incorporate individual elements
- What MUST be included for the assessment criteria?
- What would the development team need?

Things for your group to discuss today

- Do you know every member of the group and what they can offer to the project development?
- Are you aware of the expertise every member of the group can provide?
- What are the areas of overlap and thus potential conflict in the areas of expertise?

Team norms

What do effective teams Do?

- Set **vision** and **performance goals**
- Assign **task-based** *and* **team-based roles**
- Decide and create **group processes**
- Develop trust in **interpersonal relationships**
- Develop appropriate **intergroup relations**

Team norms

In **Team A** professionals wait until a topic arises in which they are expert, and then they speak at length, explaining what the group ought to do. When someone makes a side comment, the speaker stops, reminds everyone of the agenda and pushes the meeting back on track. This team is efficient. There is no idle chitchat or long debates. The meeting ends as scheduled and disbands so everyone can get back to their desks.

Team B is different. It's evenly divided between successful executives and middle managers with few professional accomplishments. Teammates jump in and out of discussions. People interject and complete one another's thoughts. When a team member abruptly changes the topic, the rest of the group follows him off the agenda. At the end of the meeting, the meeting doesn't actually end: Everyone sits around to chat.

Which team types succeed most?

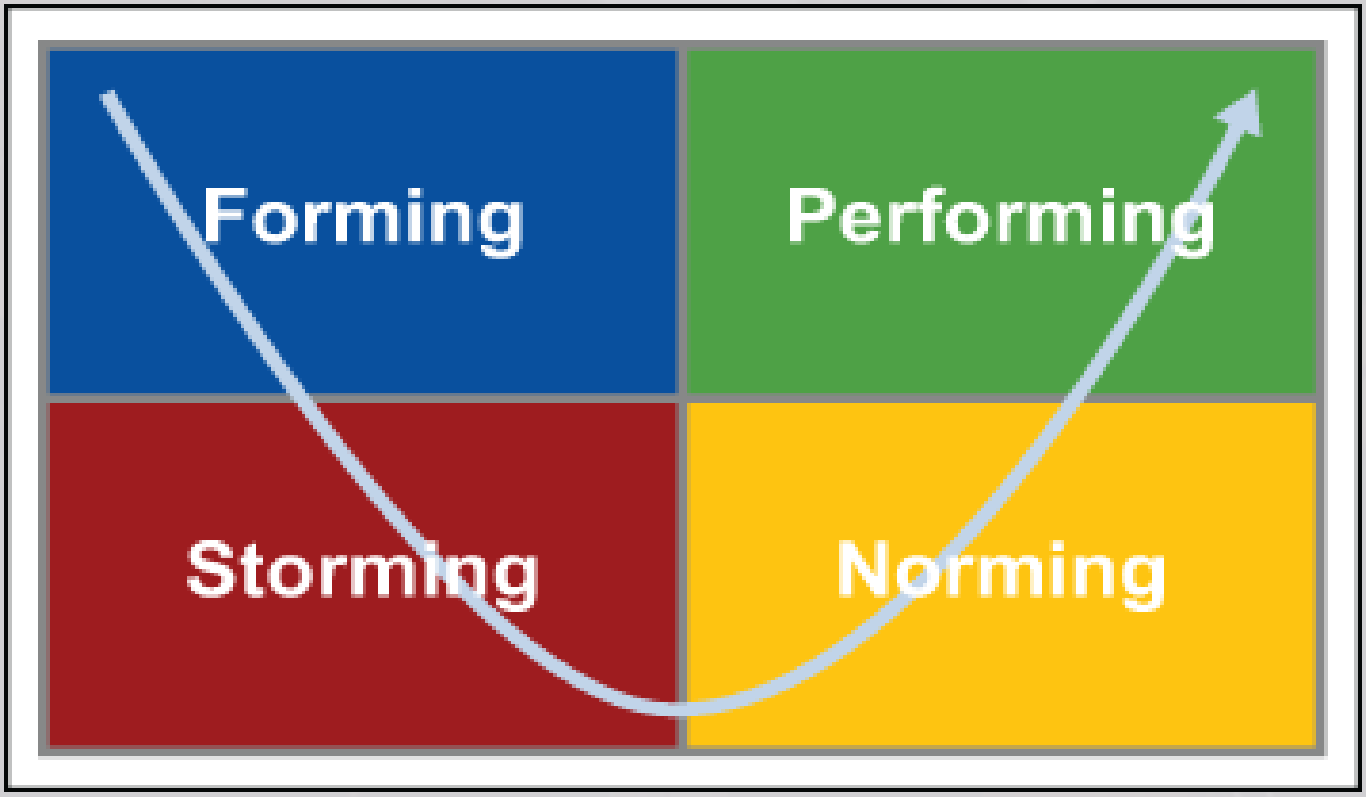
Which team types succeed most?

Team B is the healthier team because...?

Only this team allows for the healthy development of **norms** that are **supportive** and ***not*** **too restrictive**

Team norms

Developmental Sequence in Small Groups



Tuckman (1965)

Team norms

- Conversation turn-taking
- Sensitivity to mood and feelings
- A sense of confidence that the team will not embarrass, punish or exclude members

Psychological Safety

TEA/COFFEE BREAK

WORKING GROUPS:

SESSION 2: GROUP BASED LEARNING (GBL) DEVELOPMENT

Some things for your group to consider

On Day One:

- What are the learning objectives for your task?
  - Can the tasks be sub-divided?
  - How to incorporate individual elements
- What MUST be included for the assessment criteria?
- What would the development team need?

Things for your group to discuss today

- Do you know every member of the group and what they can offer to the project development?
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PEER ASSESSMENT

Individual Peer Assessed Contribution to group work (IPAC) – what students are told

Why?

- Fairer
  - If you put in more work, you get a higher mark!
- More representative of work in and out of class
- Assesses work produced, teamwork qualities and professional conduct

- Who better to assess these qualities than you?

IPAC can be included in group work so students get *individual marks* based on their contribution as assessed by peers instead of a *group mark*. This aims to promote student engagement and tackles associated problems.

How does it work?

GROUP MARK

INDIVIDUAL MARKS

peers

IPAC (tutor moderated)

tutor

How does it affect the students?

- It gives them a platform to indicate and reflect on how the group functioned
- They feel the individual mark will be fairer and more representative than the group mark
- They receive feedback and understand how peers perceive their performance
- Improve their teamwork skills and professional conduct

Example: Peer Assessment Method

The work of your colleagues (and yourself) shall be evaluated with a **critical** and **constructive** point of view against the following categories:

- ***Responsibility*** - Apply professional and responsible judgment and take a leadership role
- ***Communication*** - Ensure a good communication with the others involved in the project
- ***Respect*** - Recognising and not circumventing the individual opinion and effort
- ***Engagement*** - Attending group activities/meetings and being engaged with the project

Justification

- You will be required to write a short justification for your assessment of each student.
- Write it in a professional, constructive and concise manner
- Be honest
- Justification you write will get released back to your peers as feedback!

Rather than saying…	***Say…***
It was annoying that you turned up to meetings late.	You could improve on your punctuality to meetings, and this would help to make the meetings more successful.
You never listened to your team.	You are good at proposing actions and that is very valuable to move things along. However you could work on your ability to take other people's ideas into consideration, as it was not always clear that this was the case. It is always beneficial for the team to consider a range of ideas/solutions and to hear your critical analysis of each of them.

Task

On separate pieces of paper:

Provide written anonymous constructive feedback to fellow team mates


Aug. 11, 1942. H. K. MARKEY ET AL 2,292,387
SECRET COMMUNICATION SYSTEM
2 Sheets-Sheet 1
Fig. 1.
Fig. 3.
Fig. 6.
Inventors
Hedy Kiesler Markey
George Antheil
HEDY!
The Life & Inventions of Hedy Lamarr
Written & Performed by Heather Massie
"No less than captivating."
- The Huffington Post
HeatherMassie.com/hedy
- A True Story of Hollywood Glamour and Scientific Genius -

Educational opportunity

- **Harare International Festival of the Arts** - Harare, Zimbabwe - May 3, 4 & 6, 2018
- **Unizulu Science Centre, Science Festival** - Durban, South Africa - May 9-12, 2018
- **Women in Tech** - Cape Town, South Africa - tbd May (17, 21 or 22), 2018
- **Thope Foundation** - Cape Town, Khayelitsha, South Africa - May 18 & 19, 2018
- **Makukhanye Art Room** - Cape Town, Khayelitsha, South Africa - May 20, 2018
- **George Arts Theatre** - George, South Africa - May 24-26, 2018
- **Sci-Bono Discovery Centre** - Johannesburg, South Africa - May 28 - June 1, 2018

I may well be performing on all of the listed dates (except just one date for Women in Tech), please suggest that they check the website (which is due for updates now and along the way)
www.HeatherMassie.com/HEDY

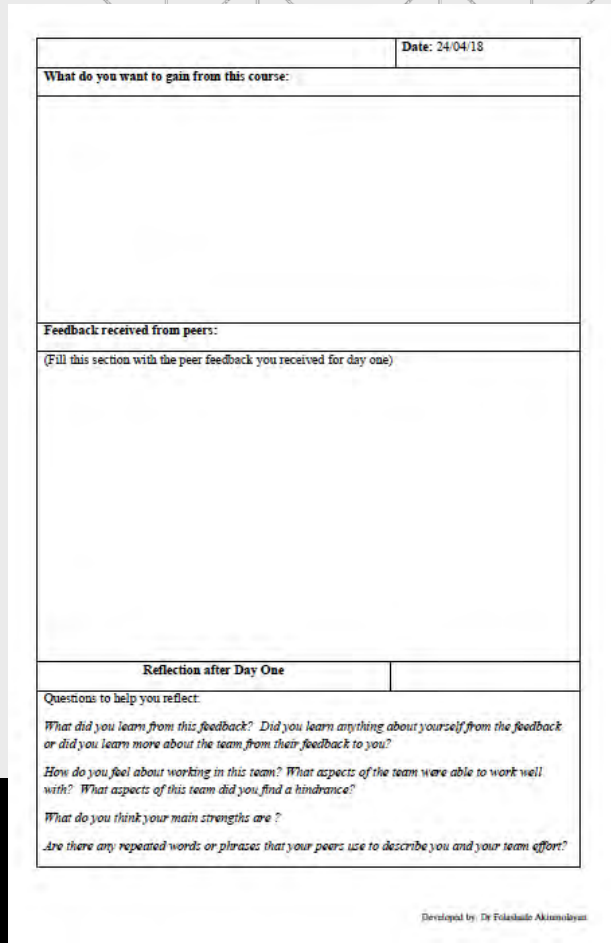
END OF DAY ONE


UCL
Engineering Education Existing Staff Capacity Enhancement Programme
FACILITATING GROUP & PROBLEM-BASED LEARNING IN THE CONTEXT OF ENGINEERING EDUCATION
Day Two: Wednesday 25th April, 2018
UCL ENGINEERING
Change the world

Self-reflection

- Review the feedback provided to you from your peers and reflect on it

- The self-reflection for this workshop should discuss:
  - How you will incorporate feedback received during Day One into Day Two
  - What improvements you need to continue to develop further
  - What goals you have for Day Two



	Date: 24/04/18
What do you want to gain from this course:	
Feedback received from peers:	
(Fill this section with the peer feedback you received for day one)	
Reflection after Day One	
Questions to help you reflect:	
What did you learn from this feedback? Did you learn anything about yourself from the feedback or did you learn more about the team from their feedback to you?	
How do you feel about working in this team? What aspects of the team were able to work well with? What aspects of this team did you find a hindrance?	
What do you think your main strengths are ?	
Are there any repeated words or phrases that your peers use to describe you and your team effort?	

Developed by: Dr Folashade Akinmolayan

Workshop Agenda

Day Two	
Time	**Theme**
9am-9.15am	Welcome and review of the Day's Agenda and Objectives
9.15am-10am	Self-reflection and Team Norms
10am-10.15am	Coffee Break
10.15am-11am	Team formation and Assessment rubrics
11am – 12pm	Working groups: GBL development workshop
12pm-1pm	Lunch
1pm-3pm	Working groups: GBL presentation and discussion
3pm-3.15pm	Coffee Break
3.15pm-3.45pm	Peer Assessment: Responses to feedback
3.45pm-4pm	Closing Remarks

What is a self-reflection document? - What students are told

- Reflection is an important step in learning from your experience and thinking about how you can do things better next time
- It provides you with a record of your professional development
- Useful as a means of updating a CV (transferable skills)
- It personalises learning by encouraging you to own and value your development and achievements
- It enables the individual to demonstrate coherence in their professional development and make plans for the future

Team norms

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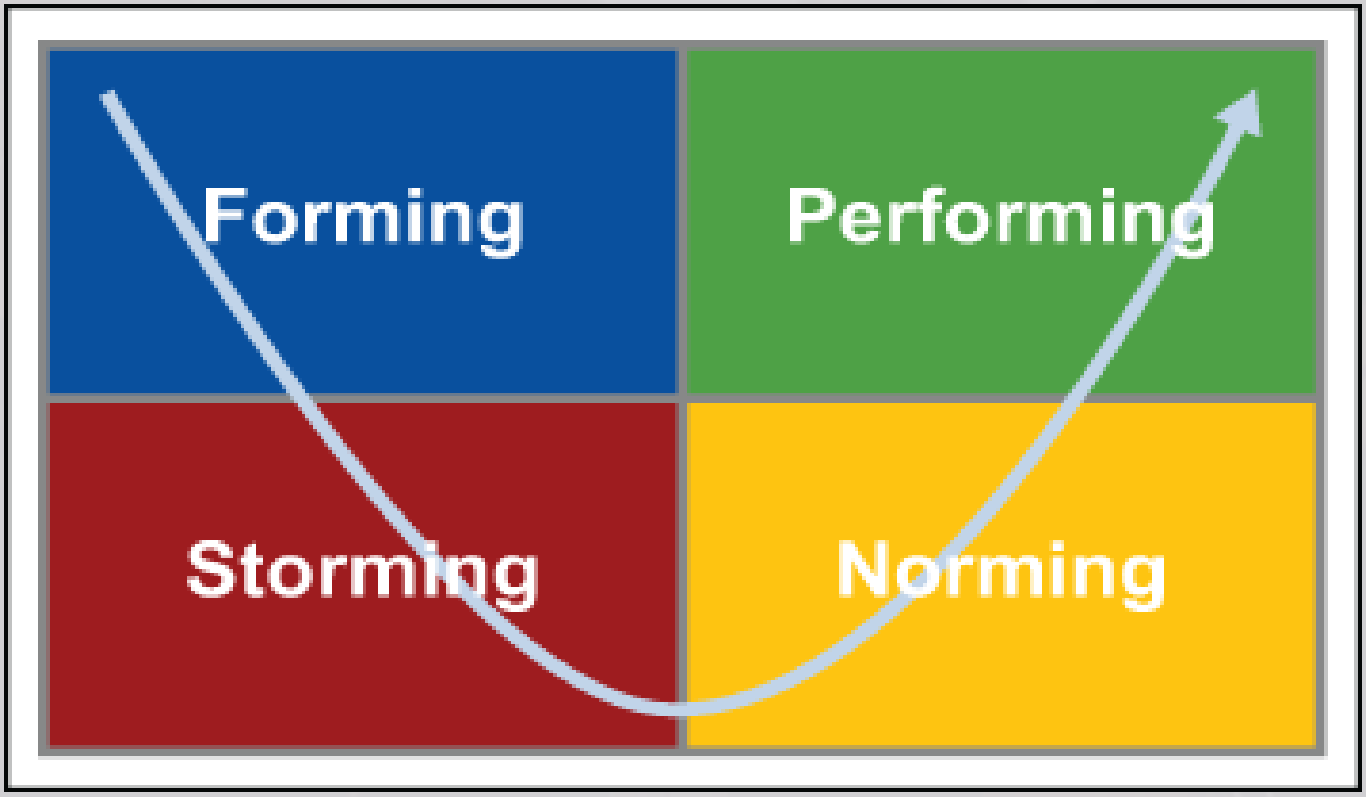

Tuckman (1965)

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Psychological Safety

TEA/COFFEE BREAK

TEAM FORMATION AND ASSESSMENT RUBRICS

Teams and Recognising Contribution

Team allocation methods

- Random
- Ability
- Mixed ability
- Term 1 IEP Teams
- Teamwork Training Teams
- Free choice
- No single gender/alphabetical order

Discuss:

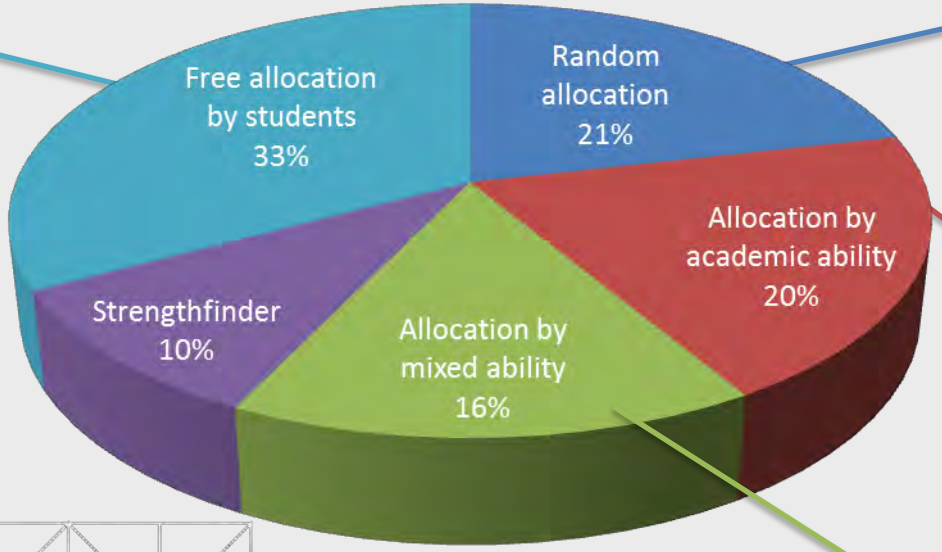
What advice can you share about formulating teams?

Student Feedback:
"The peer review on contribution was a good idea"

Organisation – team allocations

What were your impressions of the team size of 5-6 members? **86% - Just right**

We asked the students what team formations they preferred *(after Scenario 3)*:



"The **dynamics within the group were very good**, and so our overall performance felt enhanced."

"Picking own teams really **shouldn't be repeated**. Scenarios are one of the few times we get to meet new people on the course which is really enjoyable."

(Students received teamwork training)

"Teamworking was a pain"

"One of my team member is a burden."

"Every team member **pulled their weight** which was really good."

"Really good if not the **best teamwork** I have ever experienced."

Would you select the same team again?

52% - Yes
40% - Some
8% - No

" A massive problem with the scenario weeks is the **difference in contribution** throughout the group."

Same cohort

Assessment Rubric

- Team based projects are often open ended, which means there is no “right” answer
- Assessment of these projects often requires a rubric which awards a variety of grades for different criteria

“Simple” assessment rubric

ENS101P - C1 Research in Chemical Engineering	Team number:	Assessors:	Mark:
Comments (to be returned as feedback):			

	Fail	Weak	Good	Very Good	Excellent	Mark
	0 - 1	2	3	4	5	
1. Presentation of Team Technical submission and Communication Skills (10%)	No or minimal attempt. Badly written and presented, lacking in logical structure. Large gaps and omissions in research and evaluation. Frequent errors in spelling and grammar. Mostly readable but a few points are hard to understand.	Poorly structured and superficial attempt. Descriptions of research and evaluation unclear. Important points covered only superficially. No major errors and misconceptions. Many errors in spelling and grammar but readable.	Major points covered with a few inaccurate or irrelevant points. Descriptions of research and evaluation reasonably clear. Some errors in spelling and grammar but easy to read. Follows a basic written structure.	All major points covered, and explained clearly and correctly with good descriptions of research and evaluation. A few errors in spelling and grammar. Generally well-structured summary, readable and easy to understand.	All major points covered, strongly supported with suitable detail. Excellent and precise description of research and evaluation. Well proofread. Clear and easy to understand with high level of coherence throughout. A report of exceptional quality which starts & ends with the wider Challenge context. Engages reader.	
2. Understanding & Awareness of users of the research area (15%)	Almost no understanding of user’s problem, context & need. No mention or evidence of research into the context and requirements of the user. No documentation of research into user requirements.	Very limited understanding of user’s problem, context & need. Limited text provided of research into the context and requirements of the user. Superficial or basic attempt into using various research approaches (i.e. web, library, experts etc.). Briefly mentions research into user requirements.	General but at times vague understanding of user’s problem, context & need. Context of the user’s needs explained in terms of some of the social/political/economic and technical challenges. Identifies and describes relevant research into user requirements.	Clearly expressed understanding of user’s problem, context & need. Context of the user’s needs explained in terms of some of the social/political/economic and technical challenges. Interrelationships between these issues mentioned and potential limitations of the inter-relationship explored. Good quality research into the user requirements, from a broad range of sources is given.	Full in-depth discussion of Challenge problem and/or need. Context of the user needs explained in terms of social/political/economic and technical challenges, interrelationships between these issues are explained and potential limitations of the inter-relationship explored A significant range of research into the user requirements, from a broad range of sources is given. May include original & insightful discussion of user requirements.	

More complex assessment rubric

ENG102P Design and Professional Skills I Scenario 1 - Technical proposal feedback rubric								
	0 - 20% (fail)	25 - 45% (fail)	50 - 55% (lower second)	60 - 65% (Upper second)	70 - 75% (first)	80 - 85% (first)	85 - 100% (first)	Mark
Structure & Presentation of Team Report (10%)	1 – 2	3 - 4	5	6	7	8	9 - 10	/10
	Badly written report with large sections difficult to follow. Constant errors.	Report poorly structured with some sections difficult to follow. Errors disrupt general flow of the report.	Errors common but majority of report retains clear, which can be understood & followed.	Generally well-structured report, easy to follow. Some sections not presented in an efficient manner. Limited errors. Fonts type and size consistent throughout.	Report well organised throughout with few errors. Clear flow and high level of consistency in report. Reads easily as one author.	Very well organised & structured. Highly coherent with clear diagrams, tables and figures. High standard of literacy. Very few errors. Engages reader.	A report of exceptional quality & essentially error free. As left but with evidence of innovation.	
Understanding & Awareness of the overall process (15%)	1 – 3	4 - 8	9 – 10		11 - 13		14 - 15	/15
	Almost no understanding of wider knowledge surrounding the process. No mention of plant location, profit margins or recommended path. There is no discussion on catalyst.	General but at times vague understanding of the wider context surrounding the use of the process verses other options. Context of the process explained with locations, catalyst and recommended path taken into consideration.	Clearly expressed understanding of the wider context surrounding the use of the process verse other options. Context of the brief explained in locations and other deliverables taking into consideration, inter-relationships between raw materials, locations, recommended path and potential limitations		Full in-depth discussion of the wider context surrounding the use of the process verses other options. Context of the brief explained in locations and other factors taken into consideration.		Original discussion on research found, in relation to process, locations and wider market and how they can affect each other. A clear list of potential limitations for their suggestions and mitigation techniques.	

Assessment Rubric – Teamwork contribution

- Beyond technical assessment, in the first year, first project, students are taught the importance of teamwork
- An element of the overall grade counts towards the teamwork contribution grade
- to support their teamwork development, students are asked to create their own assessment criteria in order to assess the team contribution of individual team members

Assessment Rubric – Teamwork contribution

Students are asked to:

- list some activities or behaviours they think will make your team effective
- Pick the 4 that they think are most important
- Make certain that they choose activities and behaviours that they can measure. Be specific.
- Decide what is 'poor', what is 'satisfactory' and what is 'good' behaviour in each category
- Keep the descriptions simple. Less than 50 words

Example team rubric

Criteria Title	No Submission	Poor	Satisfactory	Good
Criteria Title – a short title describing the criteria to be measured.	*No submission /participation*	*A concise statement (no more than 50 words) describing what the student has to demonstrate to be seen as working at this level.*	*A concise statement (no more than 50 words) describing what the student has to demonstrate to be seen as working at this level.*	*A concise statement (no more than 50 words) describing what the student has to demonstrate to be seen as working at this level.*
Example 1: Team Participation	*No submission /participation*	*Sometimes participates in the team. Shows little concern for meeting team goals.*	*Participates in the team. Shows concern for team goals. Demonstrates effort to help the team work together.*	*Participates proactively in the team. At times leading the team in meeting goals. Contributes to decision-making which helps the team work together.*
Example 2: Team Communication	*No submission /participation*	*Sometimes communicates in a timely manner. Sometimes responds to group communications. Fails to attend the majority of group meetings.*	*Mostly communicates in a timely manner. Mostly responds to group communications. Attends the majority of team meetings.*	*Always communicates in a timely manner. Always responds to and sometimes initiates team communications. Attends all team meetings and helps to organise these.*
Example 3: Respect for Communication and Cooperation	*No submission /participation*	*Sometimes listens to others. Occasionally considers other people's feelings and ideas.*	*Mostly listens to others. Considers other people's feelings and ideas.*	*Attentively listens to others and encourages the sharing of ideas. Empathetic to other people's feelings and ideas and provides support to group members.*

WORKING GROUPS:

SESSION 3: GROUP BASED LEARNING (GBL) DEVELOPMENT

Design a team based activity with a specific technical aim

On Day One:

- What are the learning objectives for your task?
  - Can the tasks be sub-divided?
  - How to incorporate individual elements
- What MUST be included for the assessment criteria?
- What would the development team need?

On Day Two:

- What would the teams look like? Size? Formation?
- How best can we assess this activity?
- Is this activity fit for purpose or does it need to be adapted?

LUNCH

WORKING GROUPS:

SESSION 4: GBL PRESENTATION AND DISCUSSION

Let’s discuss your activities…

Discussion Topics

- How did you find working in a team to develop a team based project?
  - How did you deal with opposing opinions?
- What are the Pros and Cons of working in teams that you can identify?
  - What support could you give students?
- What improvements would you make to your activity to implement it into a large scale discipline specific project?

Discussion Topics

- Did you achieve your goals from Day One?
- What learning can you take back to your own programme?
- Reflecting on your own practises, did the feedback you receive help you edit your approach for Day Two?

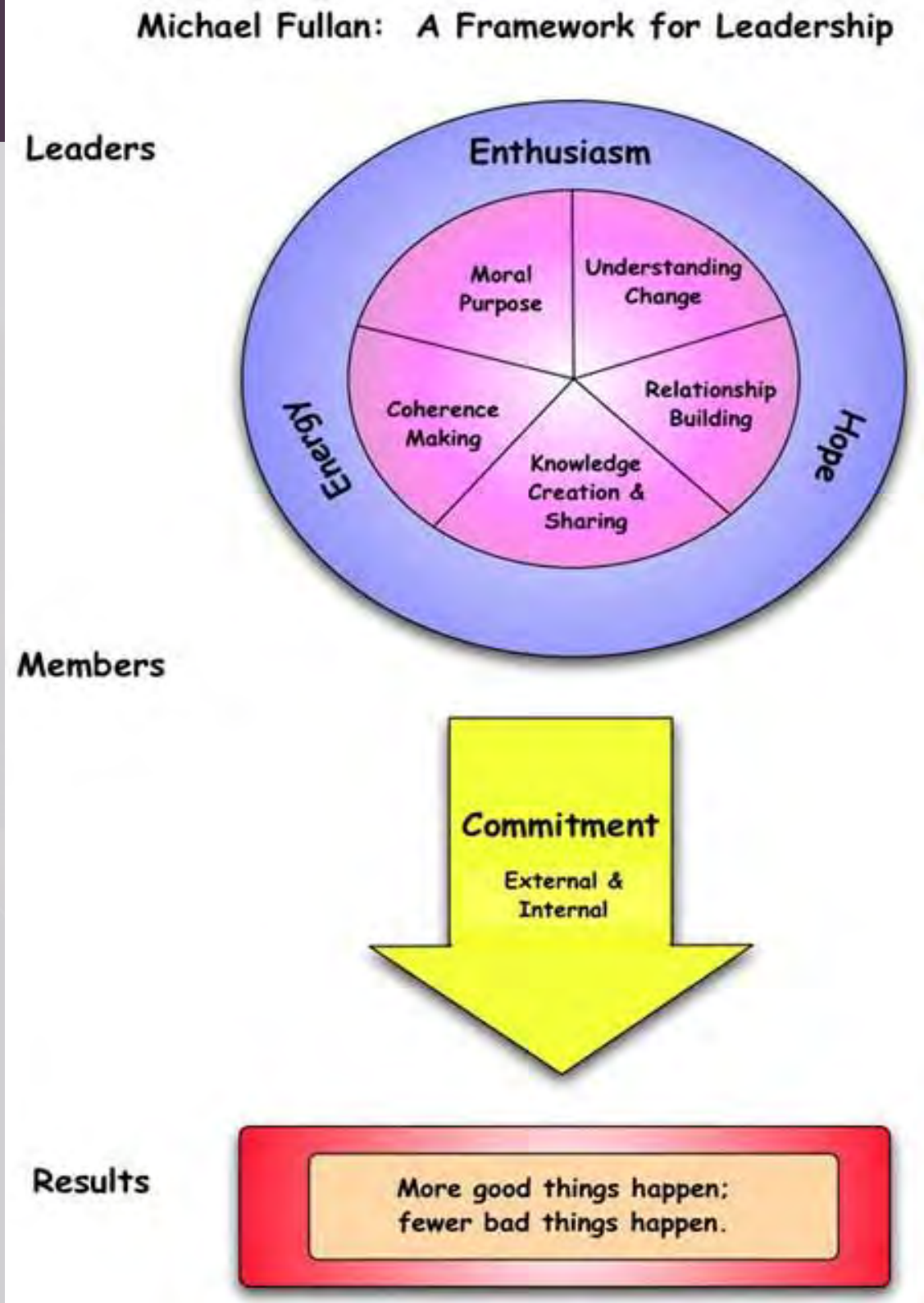
Leadership

What does a team leader need to do?

Everyone in a Team can Lead

- Motivating peers
- Nurturing followers
- Cultivating norms for effective teamwork
  - *Facilitating common vision and goals, role allocation, informality and socialising, space for safe disagreement*

Leadership

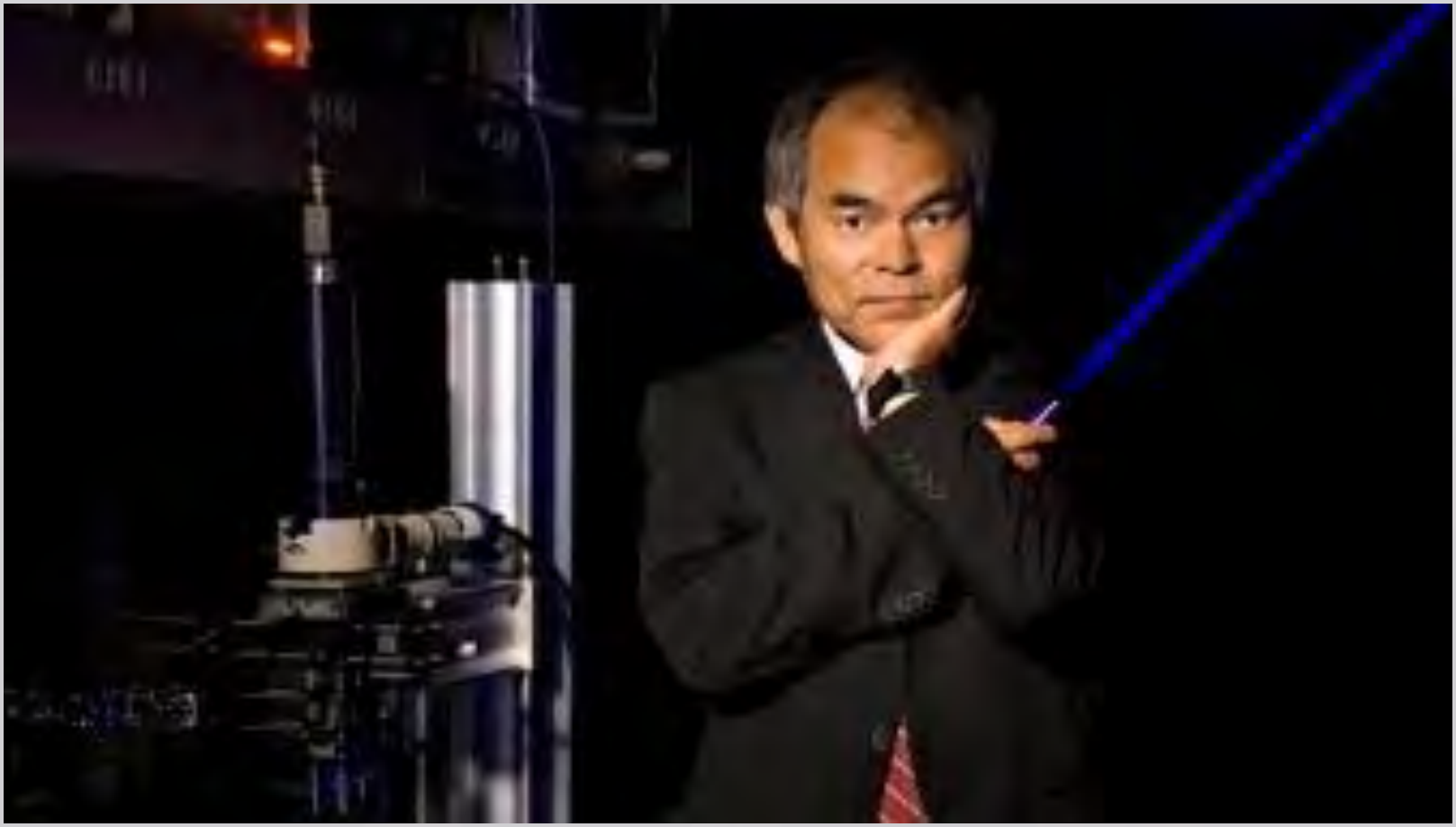

Michael Fullan: A Framework for Leadership
Leaders
Enthusiasm
Moral Purpose
Understanding Change
Relationship Building
Knowledge Creation & Sharing
Coherence Making
Energy
Hope
Members
Commitment
External & Internal
Results
More good things happen; fewer bad things happen.

Management vs Leadership

Leadership Produces Change and Movement Does not require authority	Management Produces order and consistency Must have authority
Establish Direction (vision, big picture, strategy)	Planning and Budgeting (set schedules, allocate resources)
Align People (communicate, build teams, support/challenge)	Organise and Staff (staff structure, rules, procedures)
Motivate and Inspire (empower, meet needs, energize/inspire)	Controlling and Problem Solving (incentivise, take corrective action)

Adapted from Kotter (1990) "*A Force for Change*" NY Free Press

Management vs Leadership



Shuji Nakamura with blue laser
Nobel winner for blue LED

Management vs Leadership

END OF DAY TWO

CLOSING REMARKS

References

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