

# Student experience of Peer Evaluation and Assessment of Group Work

Claire Lucas, Thomas Popham

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**WIHEA  
MASTERCLASS**

**WARWICK**  
THE UNIVERSITY OF WARWICK

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MEng, PhD, CEng MIET

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  - **ES197 - Systems Modelling, Simulation & Computation**
  - **ES2C7 – Engineering Mathematics & Data Analytics**





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- Previously Mathematical Modelling Specialist Jaguar Land Rover Ltd
- Chartered Engineer
- Discipline Degree Leader Systems and Information Engineering



# Introduction

- Assessed group work is a prevalent feature of undergraduate Engineering courses
- Group work nurtures skills that are valued by employers including oral communication, negotiation, and other interpersonal skills
- Tested at assessment centres using: competency-based interviews, group exercises and role-play scenarios

Year 1  
3 short projects worth  
10% of year

Year 4  
1 large project worth  
25% of year



# Why do we need group work?

In order to be accredited, an Engineering programme must meet the learning outcomes defined by 'AHEP 3' including...

Engineering Practice	Understanding of different roles within an engineering team and the ability to exercise initiative and personal responsibility, which may be as a team member or leader.
Additional General Skills	Exercise initiative and personal responsibility, which may be as a team member or leader



# Why do we need peer assessment?

In order to be chartered, an Engineer must demonstrate the ability to assess and give feedback

**C3** Lead teams and develop staff to meet changing technical and managerial needs.

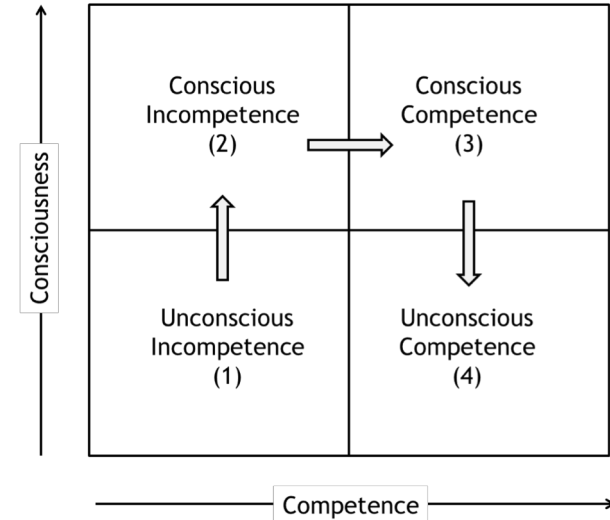
This could include an ability to:

- Agree objectives and work plans with teams and individuals
- Identify team and individual needs, and plan for their development
- Reinforce team commitment to professional standards
- Lead and support team and individual development
- Assess team and individual performance, and provide feedback.

Carry out/contribute to staff appraisals. Plan/contribute to the training and development of staff. Gather evidence from colleagues of the management, assessment and feedback that you have provided. Carry out/contribute to disciplinary procedures.

# Group work and peer review

- Opportunity to develop
  - Have to evaluate yourself
  - Have to evaluate others
  - Receive feedback from team
- Ensure that team members are awarded fair marks
- Practice skill of critically evaluating self using:
  - Examples/evidence (not feelings)



# ES197 Example project

WARWICK  
THE UNIVERSITY



## Problem definition and group formation

- Groups of 6
- Handed a problem

### Output:

- D1: Project Charter

## Requirements & design

### Output:

- D2: Requirements

## Implementation & testing

### Output:

- None

## Implementation & testing

### Output:

- D3: Test Report

## Demo day & reflection

### Output:

- D4: Demo
- D5: Team reflection

Monday

Tuesday

Wednesday

Thursday

Friday



# 4<sup>th</sup> year Group Project

GROUP 18

## AUTONOMOUS AIRCRAFT SYSTEM


# DRONE WARWICK

**CHALLENGE**

The IMechE UAS competition replicates a real-world humanitarian aid mission to demonstrate the effectiveness of a UAS (Unmanned Aircraft System) for disaster response

Teams must design, develop and demonstrate a successful UAS through:

- Navigating autonomously
- Delivering a payload of aid supplies
- Relaying telemetry to base station
- Safely returning to base




DELIVERS AID

Hiro

## APPLICATIONS

Drones are currently used in a wide range of scenarios where manpower is at a premium, this makes them a competitive and invaluable tool



- PHOTOGRAPHY - 31%
- SURVEILLANCE - 28%
- AGRICULTURE - 19%
- EXPLORATION - 13%
- DELIVERY - 6%
- OTHER - 3%

Statista, World and Reynolds, 2016

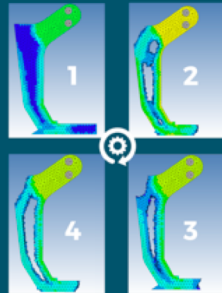
## CONTROL

An array of components combine to enable the drone to both follow preset routes and enable it to react to and record its environment


- TIME OF FLIGHT SENSOR**  
Offers accurate, real-time distance measurements
- DETECTION**  
Object recognition and collision avoidance
- INERTIAL MEASUREMENT**  
Provides closed loop feedback for stable flight
- NAVIGATION**  
Waypoint navigation and live location updates

## OPTIMISATION


Finite Element Analysis (FEA) and Topology Optimisation software will be utilised throughout the design process for every bespoke component to ensure efficient load paths and minimise the structural mass of the aircraft




GENESIS Structural Analysis and Optimisation Software, 2018




PETER HIGGINS  
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MECHANICAL ENGINEER

**Institution of MECHANICAL ENGINEERS**



  
WARWICK\_DRONE





## Team Exercise



# Exercise

- Think about your teamwork skills
- How would you rate the following:

**Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree**

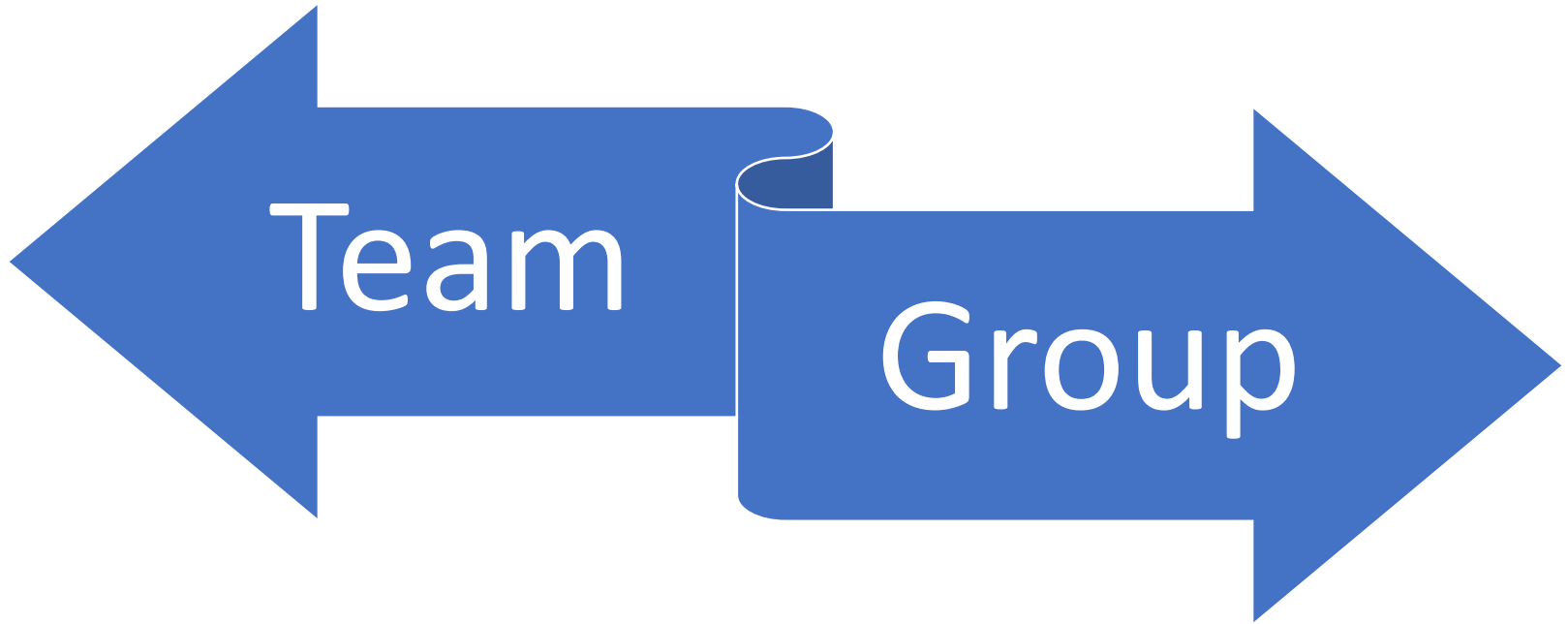
**Groups work better with a nominated leader**

**Extroverts are better at team work than Introverts**

**A person can't change their teamwork skills**

**It is easier to spot strengths/weaknesses in others than it is in yourself**





# A good team is positive and open

- The group environment in which the team operate ideally should be **supportive, positive** and underpinned by **strong communication** and plenty of **encouragement**. An effective method of tasking individuals should be established, with an opportunity for everybody to **feedback** and provide opinions and draw on others' experiences to **collectively solve problems**.

supportive  
communication  
positive  
encouraging  
collective  
reflective

# A good team understands that all roles are necessary

- **Action:** they **shape** and improve, they **implement** strategies working systematically to get things done and push the team to **complete** paying attention to detail
- **Think:** they **plant** new ideas and novel techniques coming up with and **evaluating** new ideas and they contribute **specialist** knowledge
- **People:** encourage **Team working**, supporting others and resolving conflict, they establish networks and **resource** and **coordinate** the team to undertake tasks





# A good team is not a Group

Group	Team
Separate goals, common interest	Common goal, separate skills
Strong leader bringing everyone's contributions together	Share ownership
Individual accountability with one leader	Mutual accountability
Individual work-products	Collective work-product
<b>Leader runs efficient meetings where work done is described</b>	<b>Open ended discussion and active problem solving during meetings</b>
Proud of output	Proud of each other

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# A good team is not a Pseudo-Group

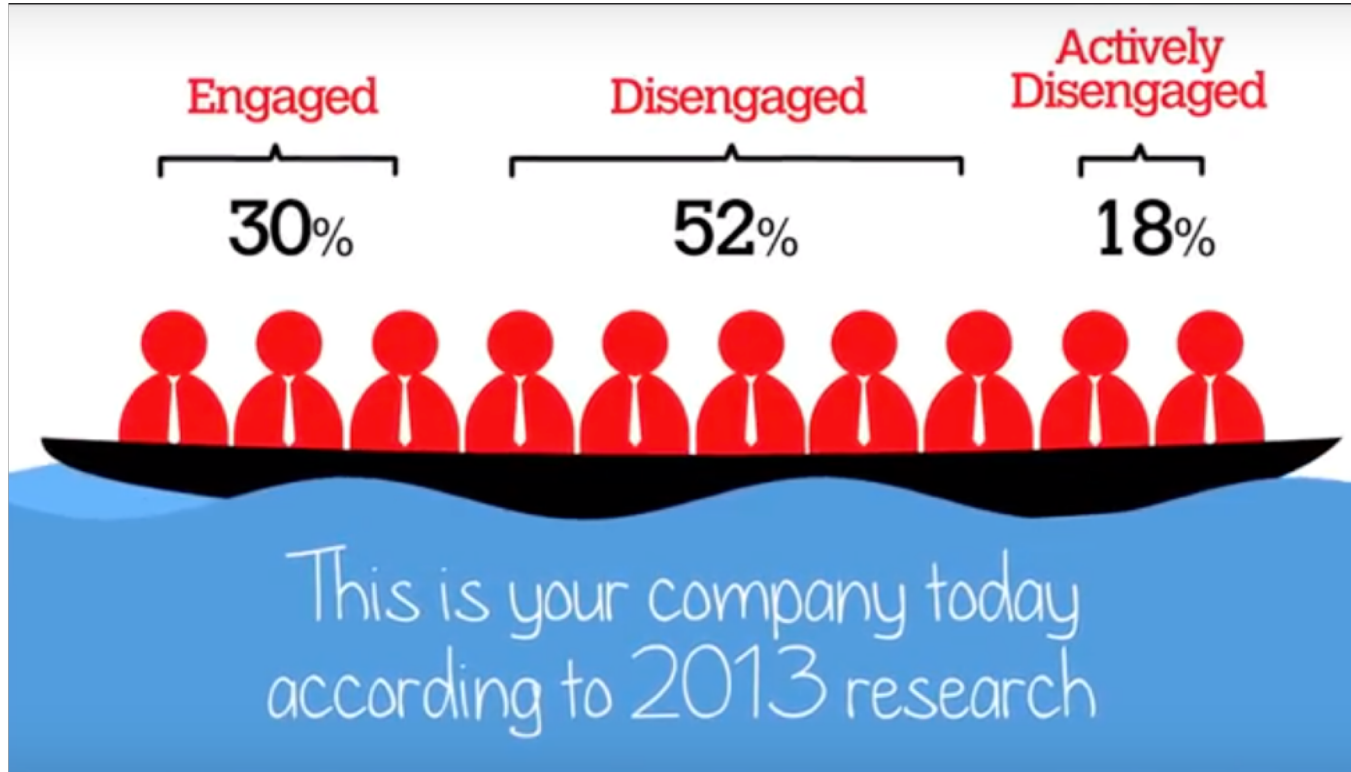
- Members immediately divide work into individual tasks and then **work independently** for the remainder of the project
- Members are rewarded and assessed as **individuals**
- Members may see each other as **competitors** for points
- Members **aren't motivated** to share their knowledge restricting technical learning



# A good team is an effective team

- Compelled to work together by common purpose and 'needing' each other
- Task requires consideration of multiple approaches, negotiation and idea generation and evaluation
- Group members work together and are **co-located**
- Group members hold themselves and each other **accountable**
- Members have concern for weaker members and want to benefit them
- Members **appreciate, promote** and **praise** each other





# Value Driven Recruitment and Development





# Typical Assessment Centres

- Interview
- Group exercises
- Role play
- Presentation
- In-tray exercise
- Problem solving exercise



**Group exercise: typically 6 people, each given separate information**  
**Employers are looking for evidence of competencies**  
**Assessed by 2 or more people**

# Competency-based recruitment and performance management

## Jaguar Land Rover

### Business Behaviours:

- My Business
- Effective Relationships
- Strong Teams
- Efficient Delivery
- Agility and Flexibility
- Positive Impact
- Clear Direction
- High performance

## BAE Systems:

### *Continuously Improving*

- Seeks and accepts feedback from others
- Can take a step back
- Considers how solutions / processes can be improved

### *Working Together*

- Is willing to co-operate to achieve objectives
- Encourages others to become involved
- Actively seeks to understand others' point of view

Competency performance

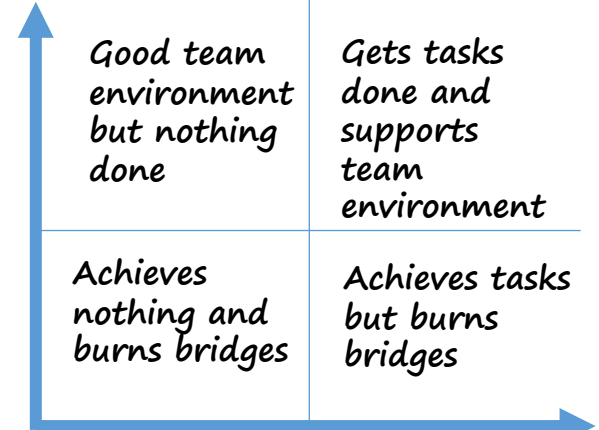


# Exercise 1 (2mins)

In pairs, discuss in which quadrant is Batman operating?



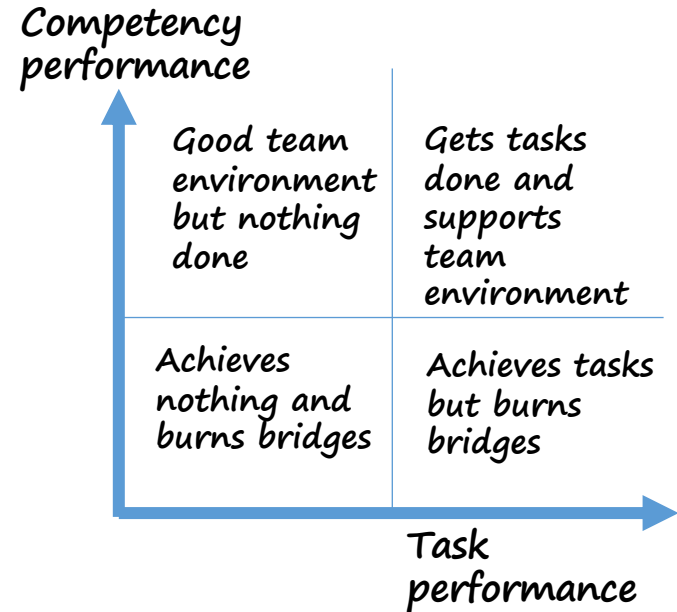
Competency  
performance



Task  
performance

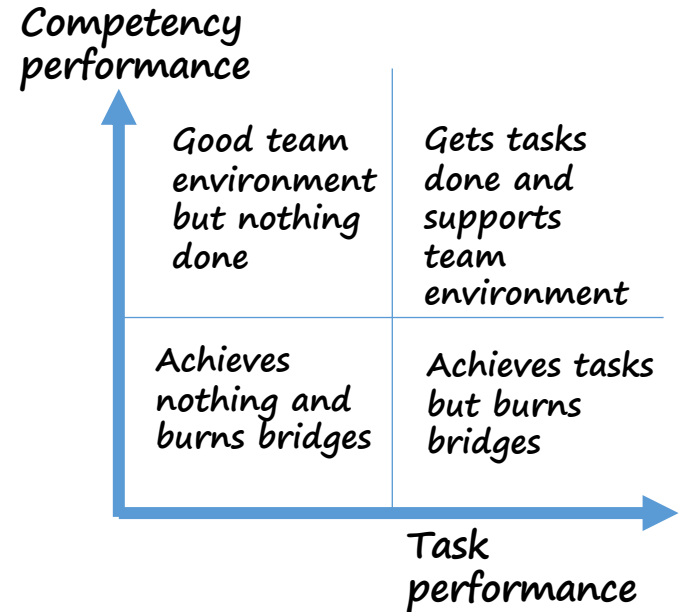
# Exercise 2 (2 mins)

In pairs, discuss in which quadrant is Professor X operating?



# Exercise 3 (2 mins)

What about Mr and Mrs  
Incredible **in this scene?**  
[https://www.youtube.com/  
watch?v=3v196bt5kTU](https://www.youtube.com/watch?v=3v196bt5kTU)



# Important...

- This is not about personality or who we do/don't like!
- People are complex and shouldn't be pigeon-holed into a particular category.
- **It is about which behaviours / attitudes / skills are applied in a particular scenario!**
- It is not a fixed thing – it is something you can change



# Group Projects for Students



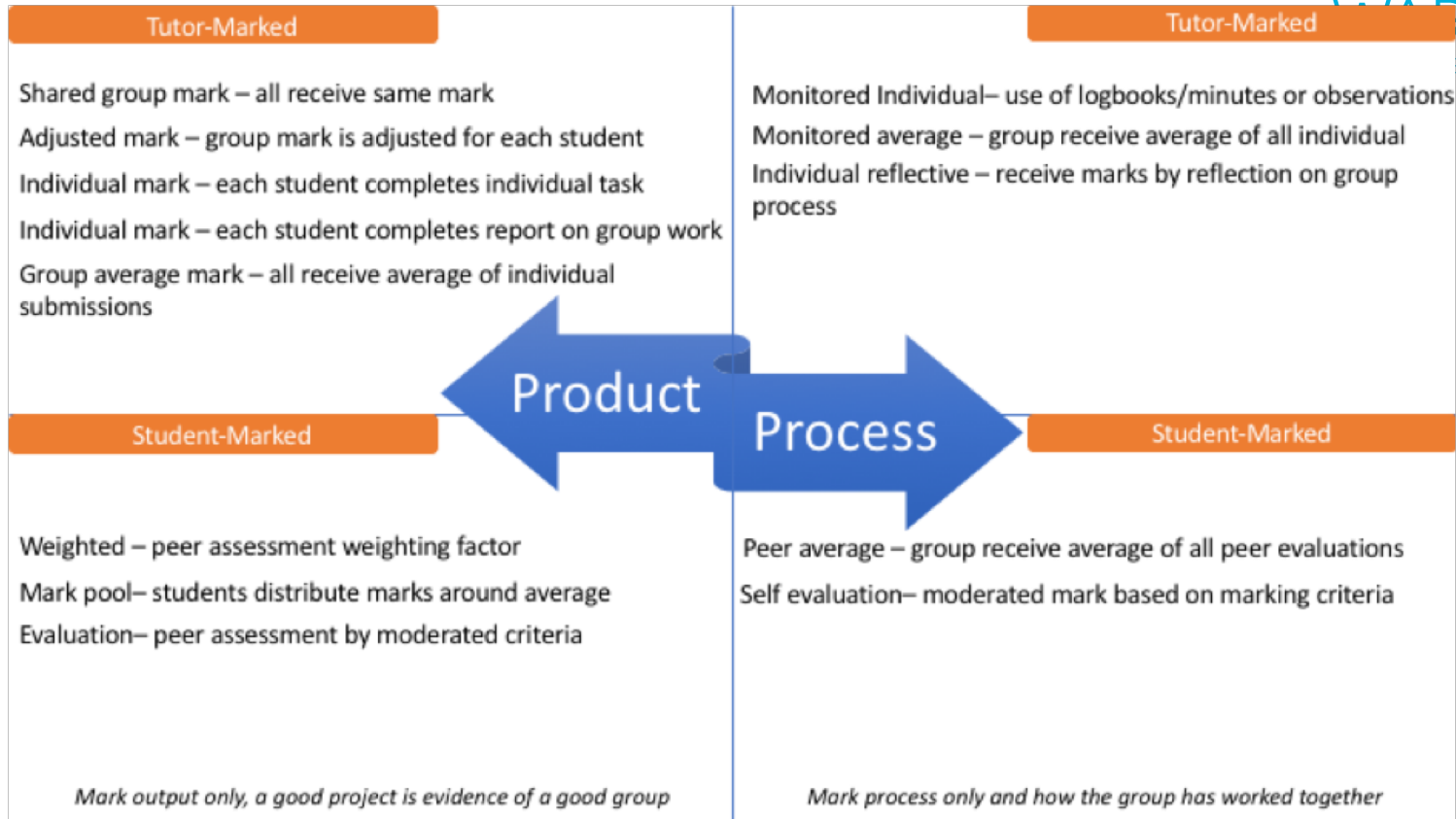
Casually Explained:  
Group Projects



# Peer Review

Team score for deliverables x peer score = individual score





# Problems with mean-weighted

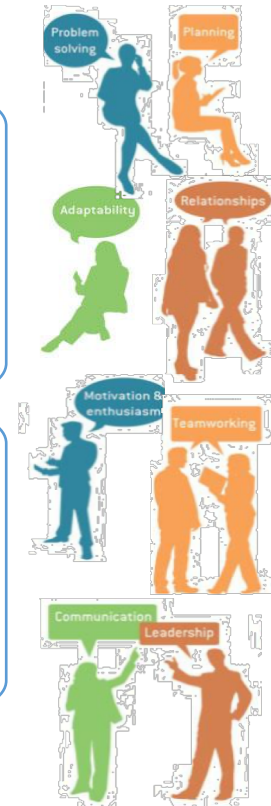
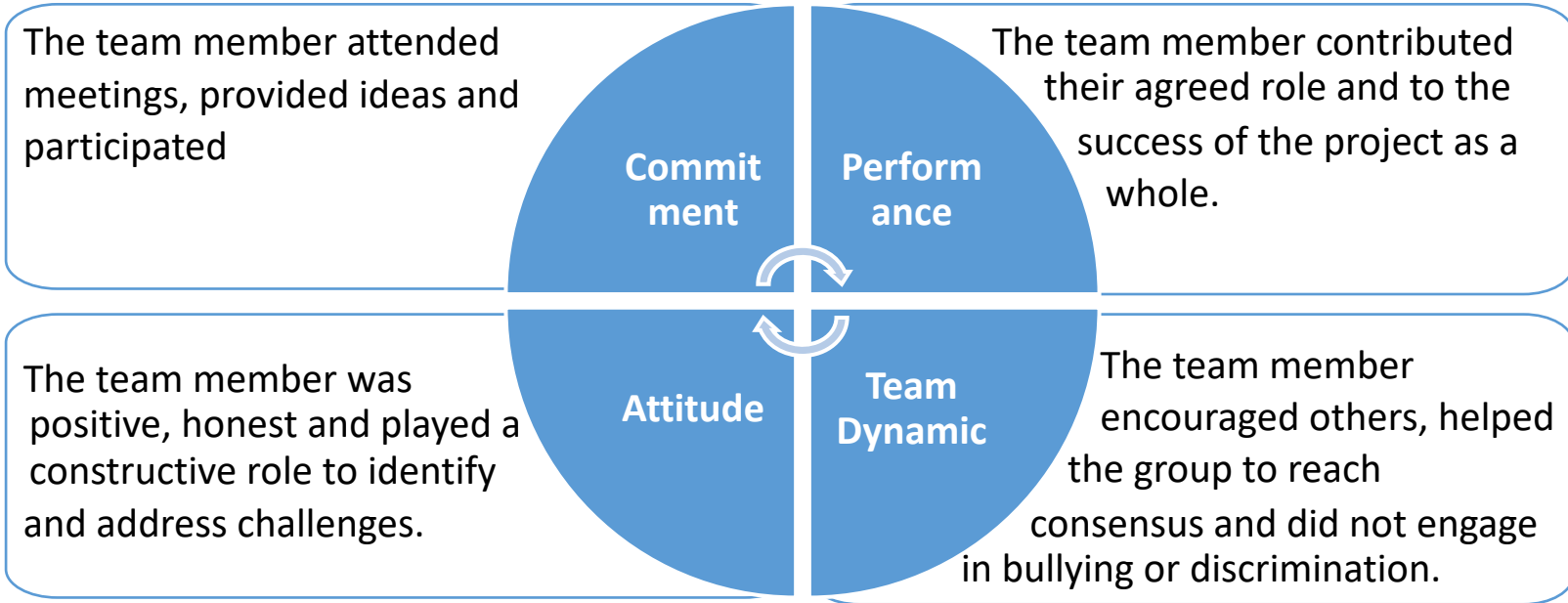
Team score for deliverables  $\times$  peer score = individual score

All scores must average to the assessed group score (product)

Problems of collusion, requiring sharing of points, student must get a lower mark in order for another to get higher...

Students benefit from a weak group! No motive to improve

# Skills to work on....



# Commitment

Well prepared for meetings, fully participated and helped others to participate.

Well prepared for meetings and fully participated.

Attended most meetings and participated with the group activities.

Missed a fair number of meetings (or very late) and only partially participated

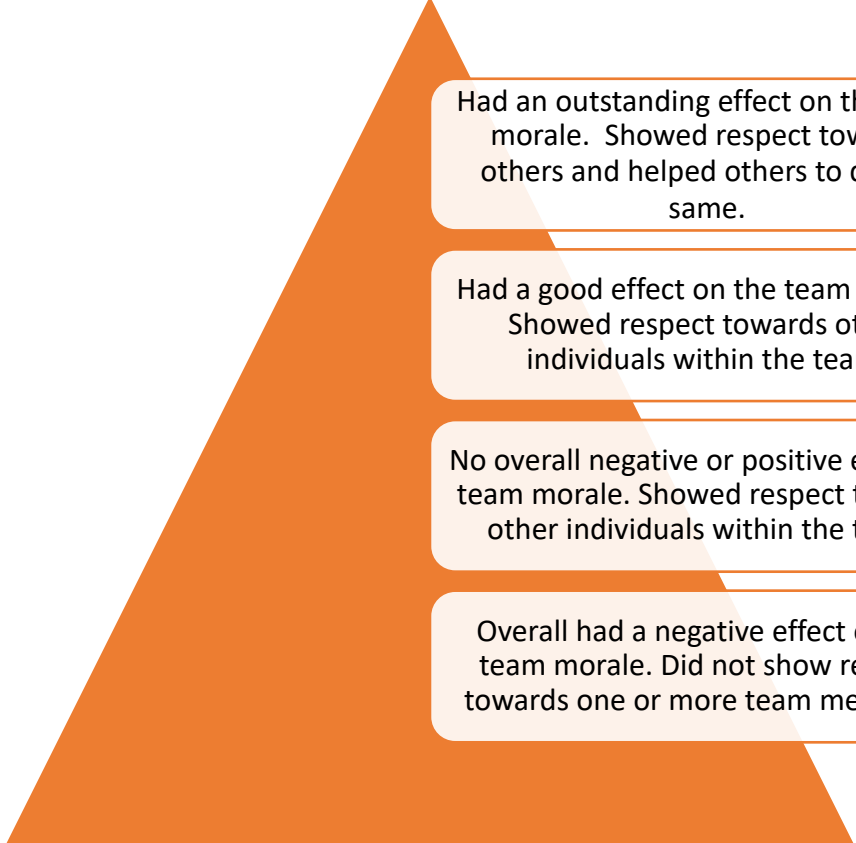
Team member did not participate.



# Performance



# Attitude



Had an outstanding effect on the team morale. Showed respect towards others and helped others to do the same.

Had a good effect on the team morale. Showed respect towards other individuals within the team.

No overall negative or positive effect on team morale. Showed respect towards other individuals within the team.

Overall had a negative effect on the team morale. Did not show respect towards one or more team members.

# Team Dynamics

Helped the whole team work together (e.g. helped other members to feel included).

Worked well with the rest of the team.

Generally worked well with the rest of the team.

Worked poorly with the rest of the team.

Team member did not participate

<b>Commitment</b>	<b>Performance</b>	<b>Attitude</b>	<b>Team Dynamics</b>
Team member did not participate.	Team member did not participate.	Team member did not participate.	Team member did not participate.
Missed a fair number of meetings (or very late) and only partially participated	Made a very minor contribution to the group.	Overall had a negative effect on the team morale. Did not show respect towards one or more team members.	Worked poorly with the rest of the team.
Attended most meetings and participated with the group activities.	Made a small but clear contribution to the group.	No overall negative or positive effect on team morale. Showed respect towards other individuals within the team.	Generally worked well with the rest of the team.
Well prepared for meetings and fully participated.	Made a good contribution to the group.	Had a good effect on the team morale. Showed respect towards other individuals within the team.	Worked well with the rest of the team.
Well prepared for meetings, fully participated and helped others to participate.	Made an outstanding contribution to the group.	Had an outstanding effect on the team morale. Showed respect towards others and helped others to do the same.	Helped the whole team work together (e.g. helped other members to feel included).
I'm not sure.	I'm not sure.	I'm not sure.	I'm not sure.

Assess yourself

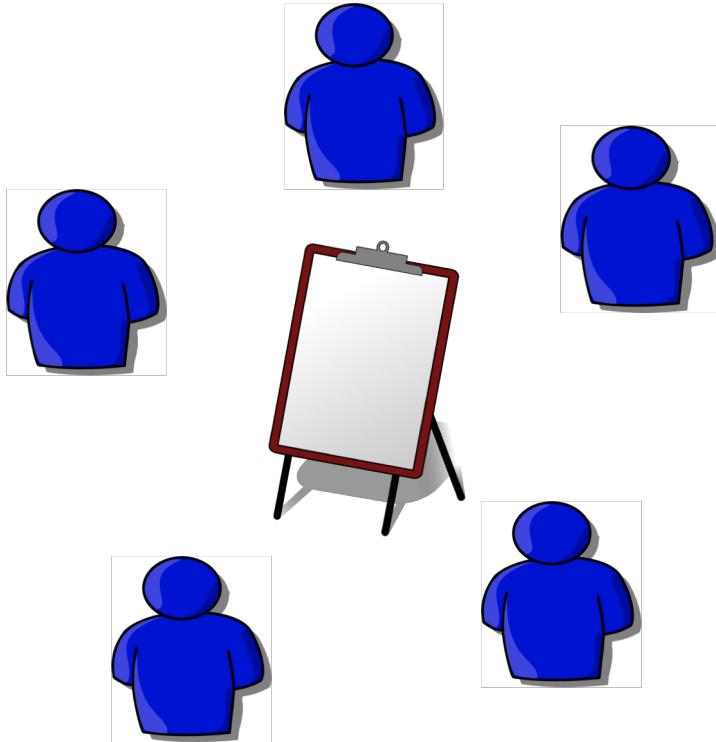


Evaluation



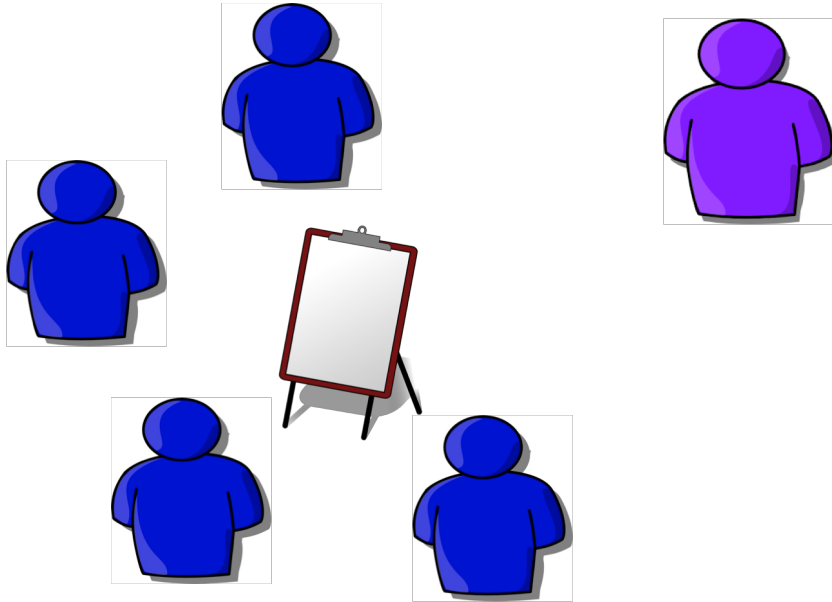


# Team Scenarios – Ideal



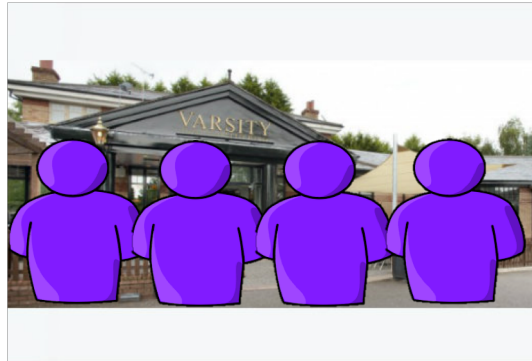
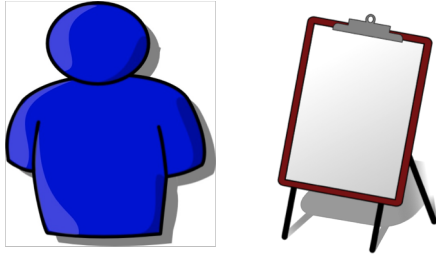
- All team members fully participate
- Honest/realistic reviews
  
- Peer system works well

# Team Scenarios – One Person Down



- All but one team members fully participate
- Honest/realistic reviews
  
- Peer system works well
  - Often member not participating will not fill in peer review
  - Can check using attendance data if available

# Team Scenarios – Lone worker



- All but one team members fully participates
- Peer system **may not** work well
  - Absent team members **may** give due credit to hard working team member...
  - ... or they **may not**
  - Encourage students to report any significant issues whilst filling out peer review systems
    - **Require another system of assessing contributions**

# How do you evaluate whether peer review has worked?

**Fair**

**Efficient**

**Appeals**

**Un-bias**

**Useful**

**Feed-forward**

**Accurate**

**Voice of Student**

**Motivation**

**Robust**

**Metrics**

**Improvement**

# How do you evaluate whether peer review has worked?

## Evaluating Assessment Quality in Competence-Based Education: A Qualitative Comparison of Two Frameworks

Liesbeth K.J. Baartman<sup>ab\*</sup>, Theo J. Bastiaens<sup>bc</sup>, Paul A. Kirschner<sup>ab</sup>, Cees P.M. van der Vleuten<sup>d</sup>

compared individual student scores on group projects to their overall performance on other modules

by observing group work in sprint sessions do academic assessors notice anything which is not captured by the proposed descriptors.

Do students feel included, valued and motivated

## An Exploration of Fairness in the Assessment and Process of Student Group Work

Rita Gibson  
Dublin Institute of Technology, rita.gibs@yahoo.co.uk

## A fair group marking and student scoring scheme based upon separate product and process assessment responsibilities

*Paul Hubert Vossen and Ian Geoffrey Kennedy*

# Does your discipline have a professional requirement for [Assessed] group work?



Answers here ranged from a certain “yes” to a certain “no”. We were sure there was an employability requirement but there was no explicit accreditation requirement and especially not a requirement for this to be assessed

# Does your discipline have a ‘ideal’ set of behaviours and values? What values and behaviours does your assessment currently reward?

Many departments thought so with some favouring strong leadership and others favouring less traditional management structures. Others would prefer a general set of ‘Warwick Values’ which were rewarded by assessment

The Warwick graduate attributes were discussed and how they do not explicitly relate to assessment values

Many departments thought they rewarded last-minute, late-night working, cultural differences between student work-habits are exposed by group work, the person who comes through to write everything reaps the reward compared to those with technical input and resilience/staying power

Academic promotion and PDR did not reward the values we identify for students